VOLUME LVI NUMBER SIX

THE NATIONAL GEOGRAPHIC MAGAZINE

DECEMBER, 1929

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In six colors, size 34 by 39 inches

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GILBERT GROSVENOR

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WASHINGTON, D.C.

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TO carry out the purposes for which it was founded forty-one years ago the National Geographic Society publishes this Magazine monthly. All receipts are invested in the Magazine itself or expended directly to promote geographic knowledge.

ARTICLES and photographs are desired. For material which the Magazine can use, generous remuneration is made. Contributions should be accompanied by addressed return envelope and postage.

IMMEDIATELY after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. Four expeditions have followed and the extraordinary scientific data resulting given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures. As a result of The Society's discoveries this area has been created a National Monument by proclamation of the President of the United States.

AT an expense of over $50,000 The Society sent a notable series of expeditions into Peru to investigate the traces of the Inca race. Their discoveries form a large share of our knowledge of a civilization waning when Pizarro first set foot in Peru.

THE Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole, and has contributed $55,000 to Commander Byrd's Antarctic Expedition.

NOT long ago The Society granted $25,000, and in addition $75,000 was given by individual members to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people.

THE Society has conducted extensive excavations at Pueblo Bonito, New Mexico, where prehistoric peoples lived in vast communal dwellings before the days of Columbus; it is sponsoring an ornithological survey of Venezuela, and is maintaining an important photographic and botanical expedition in Yunnan Province, China.

TO further the study of solar radiation in relation to long range weather forecastings, The Society has appropriated $65,000 to enable the Smithsonian Institution to establish a station for five years on Mt. Brukkaros, in Southwest Africa.

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*Made by Tiffany & Co. is noted for
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MAIL INQUIRIES RECEIVE PROMPT ATTENTION

FIFTH AVENUE & 37TH STREET
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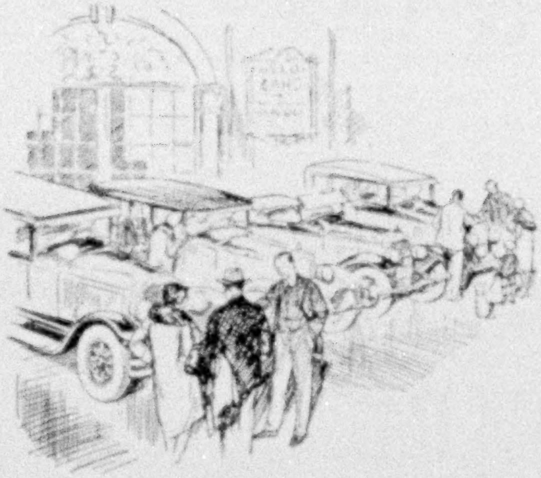
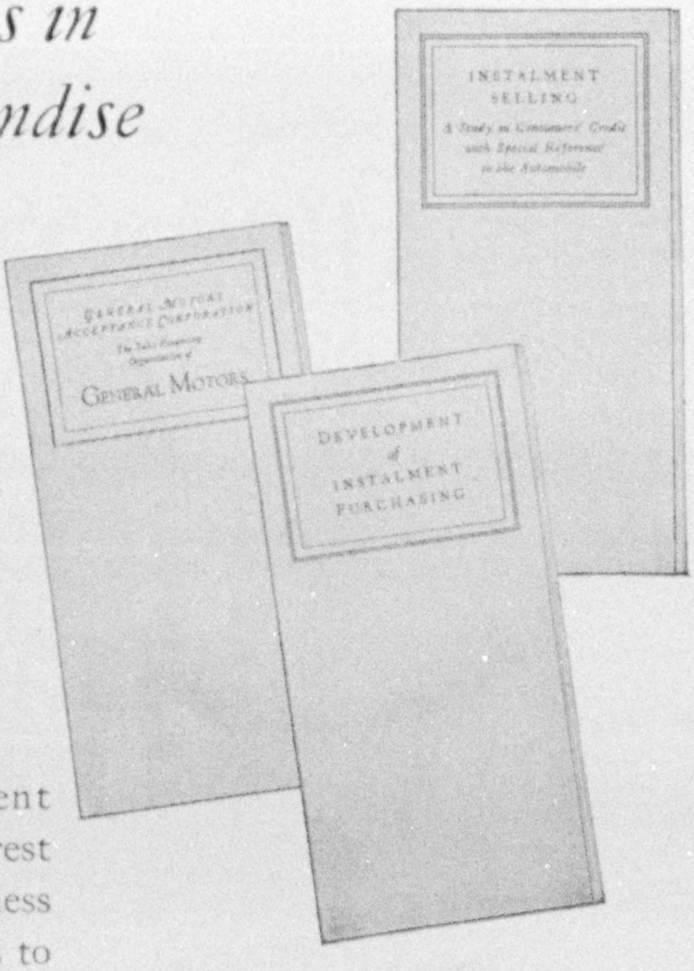
INSTALMENT SELLING

The part it plays in marketing merchandise




INSTALMENT SELLING
A Study in Consumers' Credit with Special Reference to the Automobile
General Motors Acceptance Corporation
The Sales Financing Organization of
General Motors
Development of Instalment Purchasing

THE subject of instalment selling is of special interest not only to bankers and business men, but to everyone who has to do with the distribution of merchandise wherein consumers' credit plays a part.

General Motors has issued a booklet entitled "Instalment Selling — a Study in Consumers' Credit with Special Reference to the Automobile." This is a résumé of the research by Professor Edwin R. A. Seligman, which covered fifteen months of study and included every phase of business in which instalment selling is a factor.

This booklet, together with two others on the subject of instalment selling, will be mailed free upon request to Department K-9, General Motors Corporation, Broadway at 57th Street, New York.

GENERAL MOTORS

"A car for every purse and purpose"

CHEVROLET · PONTIAC · OLDSMOBILE · MARQUETTE · OAKLAND · VIKING
BUICK · LaSALLE · CADILLAC · *All with Body by Fisher*
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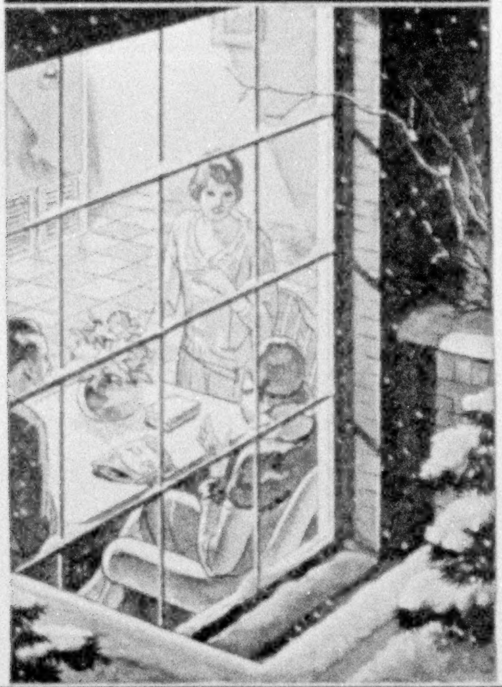
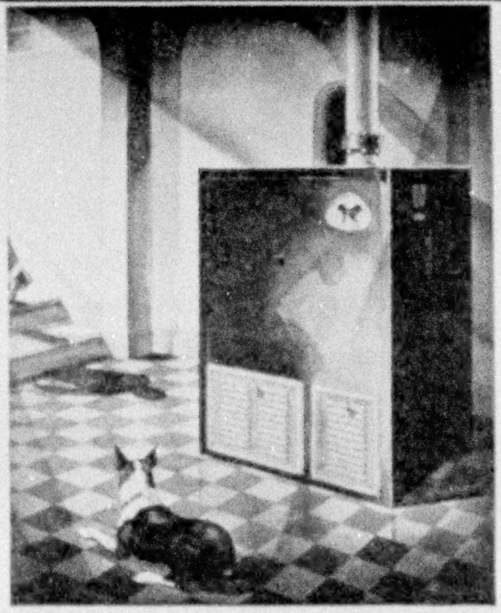
Where
WINTER *time*
is
BRYANT *time*



the furnace-months lose their terrors!



For steam, vapor, hot water and warm air systems in old houses and new residences, large and small.

BRYANT GAS HEATING

—lets your Pup be your Furnace Man

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IN the 69% of the area of the United States in which 79% of its inhabitants live, the heating plant is the "member of the household" on which, for six months out of each year, the comfort, health and happiness of all the others depend.

Under those conditions, speaking frankly, isn't it short-sighted not to enjoy the most dependable and labor-free house-heating available?

With Bryant truly Automatic Gas Heating you can throw away your coal shovel —junk your ash can—make a single match your winter's kindling—tend furnace by the calendar, not by the clock—add a useful room to your house—laugh at the ups and downs of the temperature outside—enjoy winter—*and*—"let the pup be your furnace man."

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LOOK TO THE BODY!

AN independent, nation-wide investigation has established that ninety-four and four-tenths per cent of all who express a body preference prefer Body by Fisher as against all other bodies. The reason for this overwhelming good will is not far to seek. Fisher Body, through its own immense facilities and resources and those of General Motors, is able to build ever greater value and quality into every Body by Fisher. Furthermore, Fisher Body is not handicapped by any necessity of building *down* to a set price, but, on the contrary, builds *up* to a set standard of high quality regardless of price; and in doing this helps to create a demand so great that low costs are incidentally attained.

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FROM THE CANADIAN BORDER TO LONG ISLAND SOUND, PATROL CARS CARRY THIS UNFAILING WINTER PROTECTION « « EVEREADY PRESTONE

EVEREADY
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THE PERFECT ANTI-FREEZE
Does Not Boil Off
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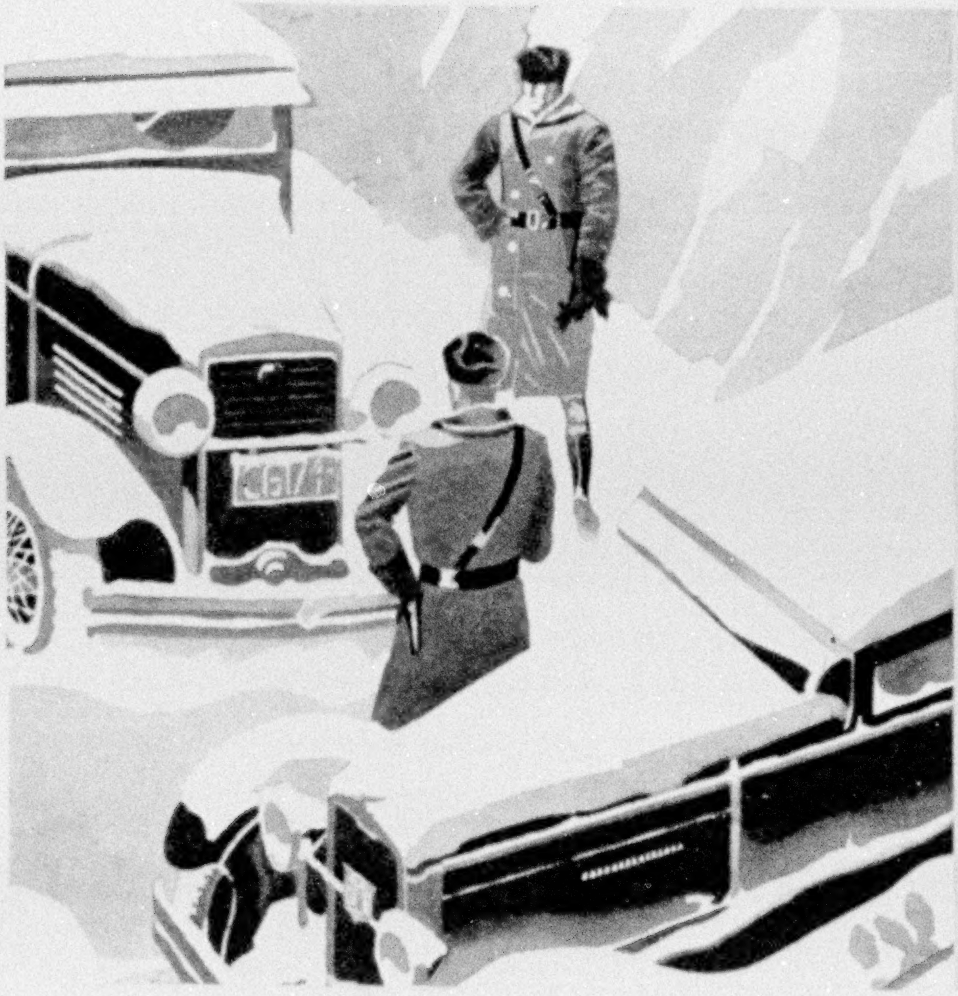

Eveready Prestone does not contain any alcohol or glycerine.

9 POINTS OF SUPERIORITY

1 Gives complete protection.
2 Does not boil off.
3 Positively will not damage cooling system.
4 Will not heat up a motor.
5 Circulates freely at the lowest operating temperatures.
6 Will not affect paint, varnish or lacquer finishes.
7 Non-inflammable.
8 Odorless.
9 Economical—one filling lasts all winter.

EVEREADY PRESTONE

(TRADE-MARK REG.)

FOR PREPARATION OF THE

PERFECT ANTI-FREEZE

READ what Major John A. Warner, Superintendent, has to say about the use of Eveready Prestone, the perfect anti-freeze, in the cars used by the New York State Troopers in the performance of their duties:

> "We have had no single instance where complaint has been found with it. It has been employed under the most trying of weather conditions. Frequently our men are on the open roads for hours at a time, during which their cars must function under all sorts of stress and strain.
>
> "It is gratifying to us that during the past two years Eveready Prestone has contributed so materially to the success with which the State Police have been able to carry on their work."

Wherever men, engaged in hazardous cold-weather duties, entrust their lives and reputations to motors, there you will find Eveready Prestone. At Army flying fields. At Navy air stations. With Commander Byrd in the Antarctic. And one supply of Eveready Prestone will provide *your* motor with the same complete, permanent protection against freezing. It possesses *all* the properties pointed out by the National Bureau of Standards as essential for an anti-freeze.

A single supply added to the radiator will provide trouble-free surety against all freezing hazards through all kinds of weather. You can buy it at the nearest garage, filling station, automobile supply shop or hardware store.

Thoroughly tested and 100% approved by the American Automobile Association.

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General Offices:
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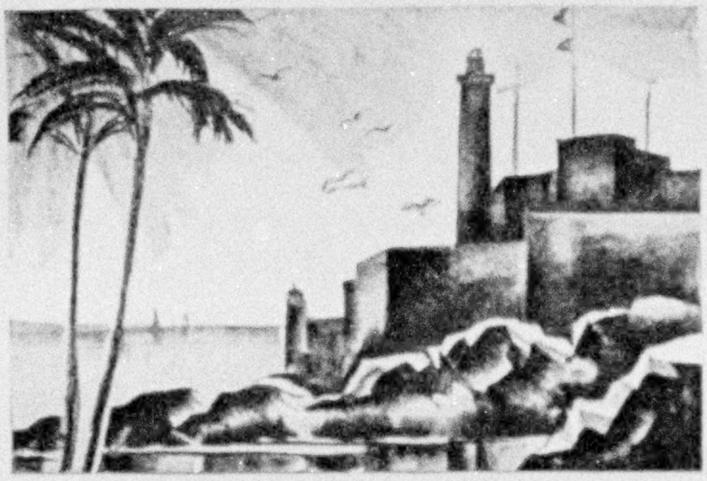
BANISH WINTER

—enjoy a sunlit cruise

MEDITERRANEAN CRUISES by WHITE STAR LINE...46 days. Turn winter bleakness into a summer-time fiesta...Join in the gay, pulsing life of Gibraltar, the Riviera, Naples...then step backward in Time... Algiers, Athens, Constantinople, Syracuse, the Holy Land...with five days in Egypt. Two intimate cruise liners—**Adriatic** and **Laurentic**—for people who expect the unusual in cruise comfort. From New York: January 9, January 18, February 27, March 8. First Class $695 up; Tourist Third Cabin $420—both including shore excursion program.

NEW YORK-CALIFORNIA via HAVANA and PANAMA CANAL. Three magnificent NEW liners—**Pennsylvania, Virginia, California**—largest steamers ever built under the American flag. All outside rooms, many with private bath. Luxury unsurpassed on the seas. Delicious loafing on broad decks—swimming in the open-air, built-in deck pools—dancing under the stars—deck games and impromptu entertainment throughout the trip. 13 days coast to coast—New York, Havana, Panama Canal, San Diego (Coronado Beach), Los Angeles, San Francisco. Fortnightly sailings in either direction. 5,000 miles of delightful travel with opportunities for fascinating shore trips at Havana and Panama Canal.



HAVANA-NASSAU-BERMUDA CRUISES by RED STAR LINE, 11 halcyon days...Six short, thrilling tours to picturesque ports...HAVANA, pleasure capital of the Caribbean; NASSAU, quaint tropic outpost for tennis, bathing and idling in the grand manner; BERMUDA, enchanting Gulf Stream retreat. Stop over at each dazzling port—or the one you find most intriguing—and continue on the next round of the popular **Lapland,** the ship with the club-like atmosphere. Fortnightly sailings from New York December 28 to March 8. $175 up.

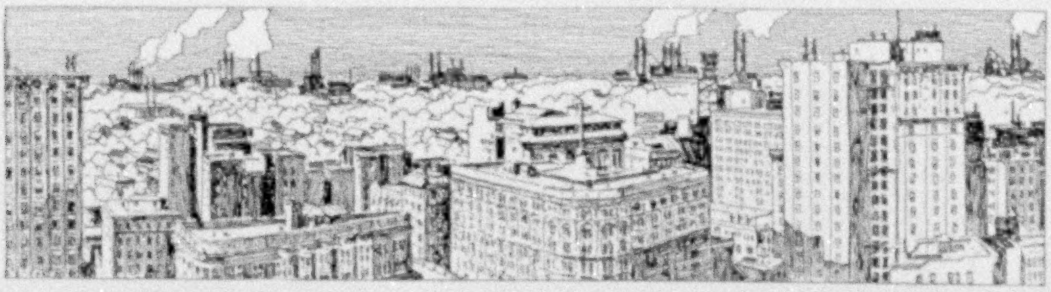
WHITE STAR LINE
RED STAR LINE
PANAMA PACIFIC LINE
INTERNATIONAL MERCANTILE MARINE COMPANY

For full information address No. 1 Broadway, New York; 180 No. Michigan Ave., Chicago; 460 Market Street, San Francisco; our offices elsewhere or authorized steamship agents.

You are paying for a Packard Why not own one?

Before buying an automobile consider these two facts: After costs are not less because first cost is less. A car priced at twice as much does not cost any more if driven twice as long.

Many motorists have been kept from Packard ownership because they thought it too expensive. Yet records prove that it costs no more to enjoy the luxury of Packard transportation.



CONFIRMED BY OWNERS IN ATLANTA

There are eight items of cost to consider in owning any car. Compare these costs as between a Packard Standard Eight and any car of its size down to half its price and you will find:

That the license cost for the Packard is little, if any more.

That garage cost is the same.

That insurance may be slightly higher. But this applies principally to collision coverage—a very small sum annually.

That the three operating items—gas, oil and tires—show no advantage for either car. The Packard Standard Eight gives 10 to 12 miles or more to the gallon of gasoline; 1,000 miles or more to the gallon of oil; 15,000 to 20,000 miles or more to the set of tires.

That Packard repairs actually cost less. This is due, first, to the simplicity of Packard design which makes repair work quick and easy; second, to Packard quality which makes less repair work necessary; and third, to Packard's advanced motor and centralized chassis lubrication systems which protect factory-built-in precision.

And finally you will find that depreciation on a Packard costs no more because country-wide records prove that Packard cars are driven far longer—in Atlanta, Ga., for example, much more than twice as long as the lower priced cars traded in on them.

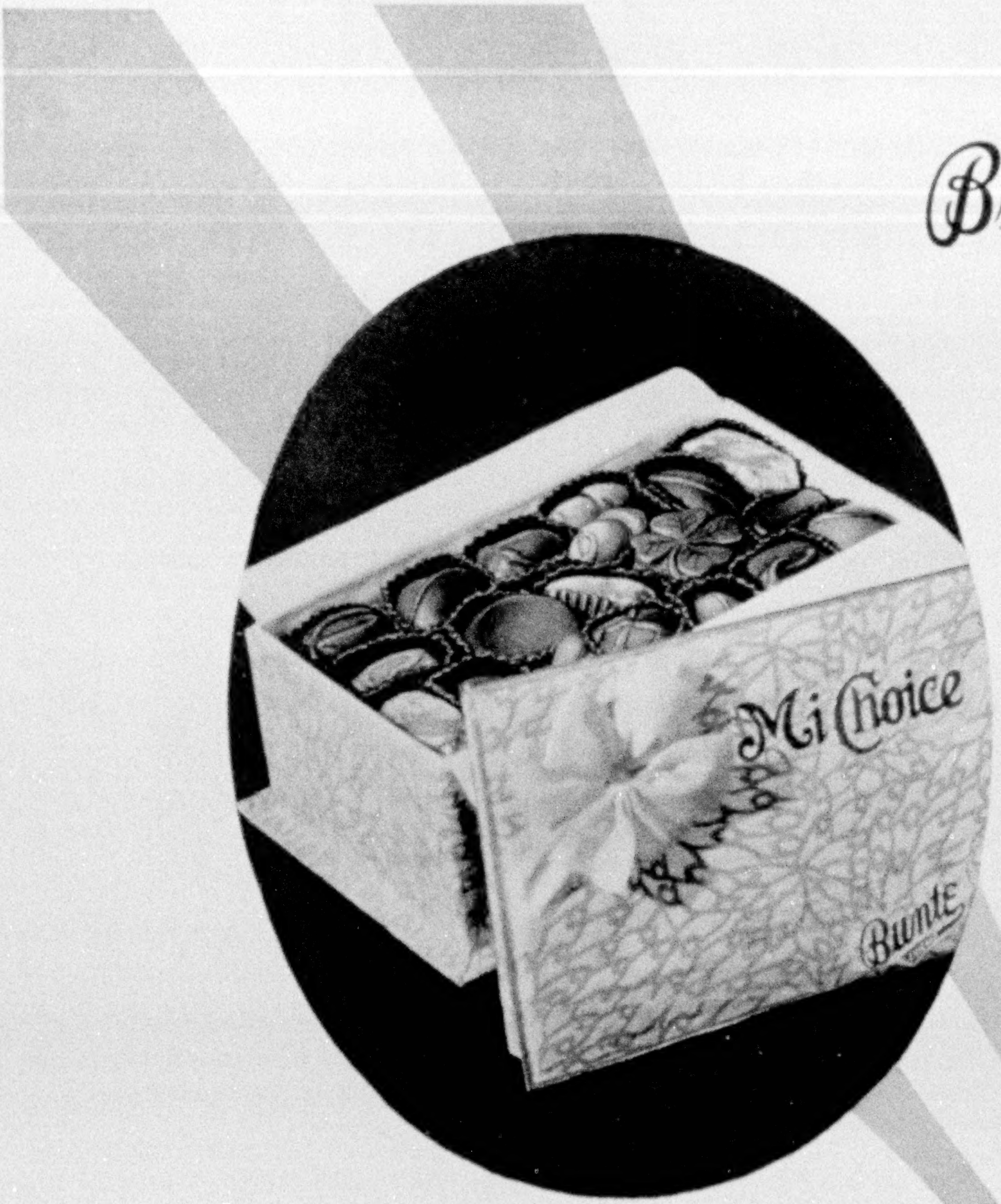
Atlanta motorists have learned that Packard transportation costs no more. There, three out of four buyers of Packard Standard Eights turn in other makes of cars. And, if past records are an indication, they will remain in the Packard family indefinitely, as only 3 percent of Packard owners in Atlanta have changed to other automobiles.

Figure out your own costs of motoring and compare them with the costs of owning a Packard. The Packard dealer in your city has the facts. You may find that you, too, can enjoy the luxury and distinction of Packard transportation at no increase in your motoring expense.

PACKARD MOTOR CAR COMPANY
DETROIT - - - MICHIGAN

ASK THE MAN WHO OWNS ONE

Bunte
WORLD FAMOUS
CANDIES



*T*HOSE who possess background, tradition and a definite reverence for social correctness find in Mi Choice Chocolates the added Yuletide gift that so admirably reflects the giver. If your dealer does not have the Mi Choice package, use the coupon below. *Smartly packaged . . one . . two . . three and five pounds.*

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☐ I enclose $1.50 for a one pound Mi Choice package.

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25¢
Mi Choice
Bunte

Name ....

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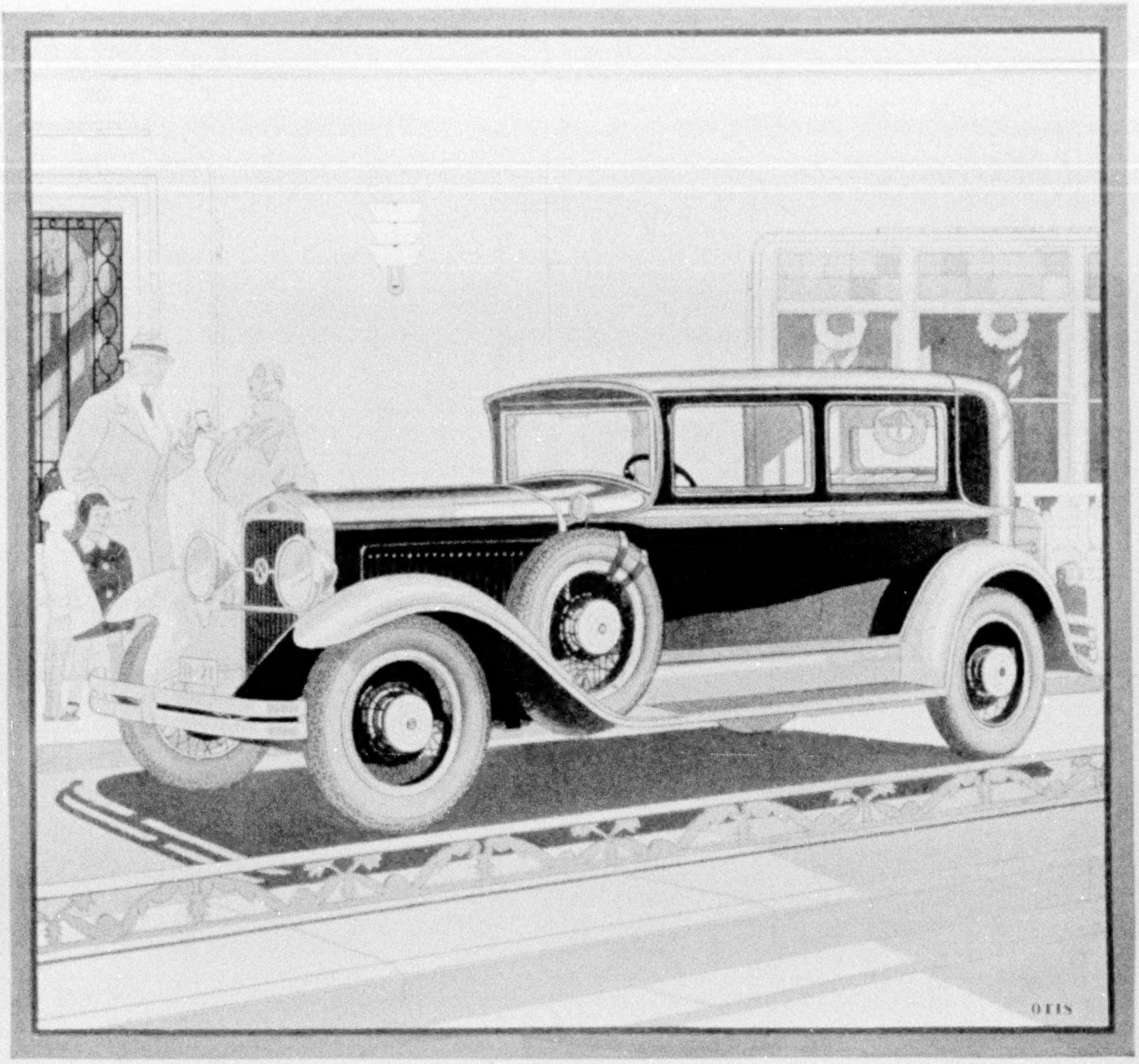
City ....

Dealer's Name ....



Studebaker Commander Eight Brougham, six wire wheels and trunk standard equipment, $1695 at the factory.

This Christmas . . . give her the Keys to Happiness. Each year this gracious Christmas custom grows in favor . . . the presentation of the Keys to Happiness to one well beloved. An attractive gift case holds the shining keys for one of Studebaker's smart new motor cars—an Eight by the Builder of Champions! When everyone is turning to the responsive, flexible power, the satin-smoothness—and the *distinction*—of the Eight, this glorious gift of her very own car becomes more precious. For women are alert to the motor car trend—they know that the world's finest cars are Eights! And you know her car will be worth more a year from now if it *is* an Eight—particularly an Eight by Studebaker, world's largest builder of Eights, with 77 years of manufacturing integrity as a background.

STUDEBAKER

Builder of Champions

Pires Monument, Dallas, Texas
Designed by Herbert M. Greene, La Roche & Dahl

THE white marble Temple of Hercules at Tivoli, near Rome, was constructed in the year 300 A. D. This beautiful circular edifice with its Corinthian columns was the model for the classic Pires Memorial, which is entirely of Georgia Marble. No other monumental stone could carry out the beauty of design, and the marvelous durability of the original quite so well.

Our booklet "That Memory May Live Forever"
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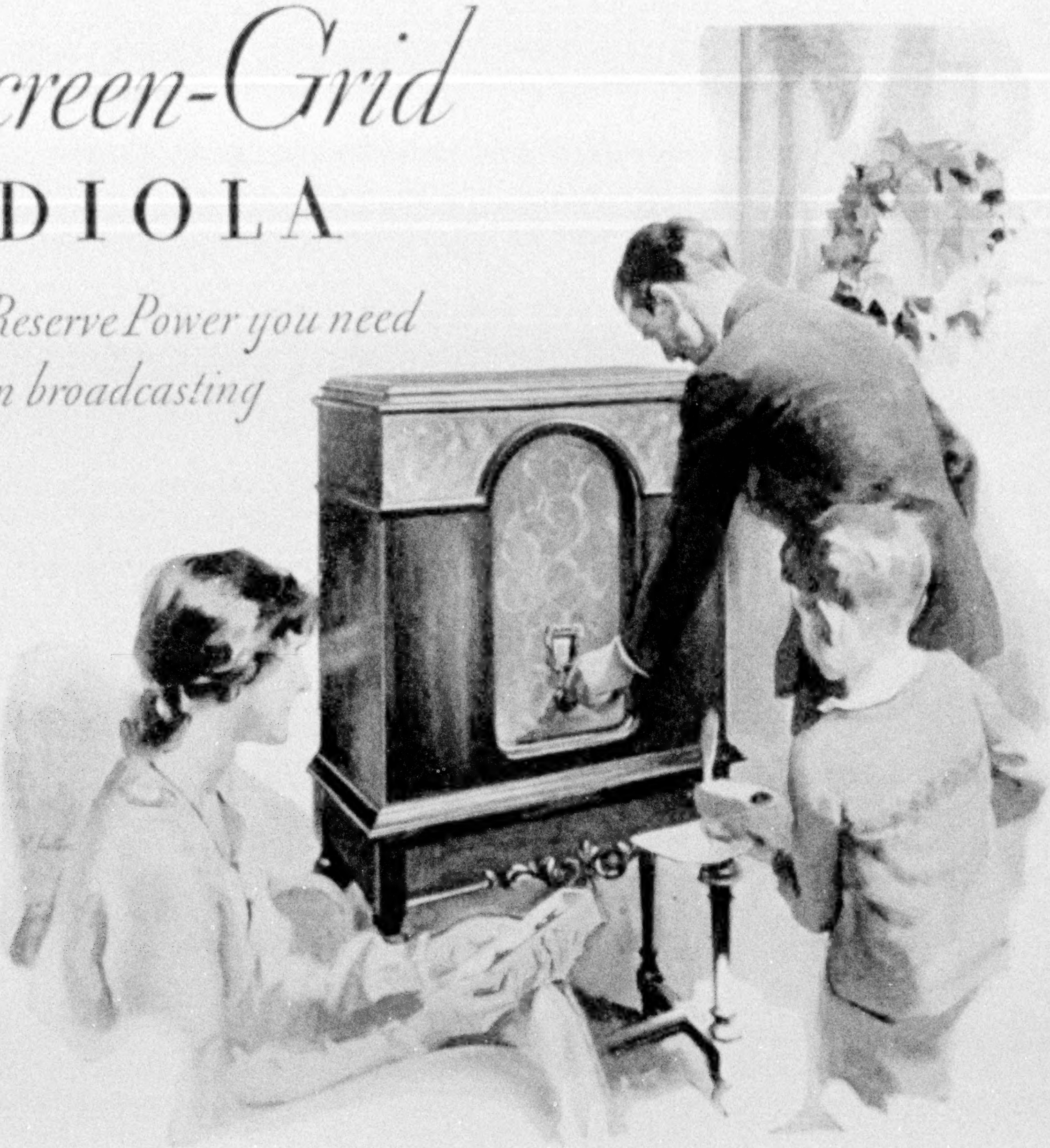
GEORGIA MARBLE

THE *Screen-Grid* RADIOLA

gives you the Reserve Power you need for modern broadcasting



RCA made Screen-Grid Radio possible by creating the high-power Screen-Grid Radiotron and the new Screen-Grid circuit.

The great value of Screen-Grid is that it gives you high power with few tubes—the big reserve of power you need today under modern broadcasting conditions.

Obviously you get your greatest guarantee of high quality performance with Screen-Grid in a Radiola built by the same men who created the new tubes and circuit and gave them to the radio world.

In addition, you get the added advantage of another RCA achievement . . . you get the freedom from distorting noises and electrical hum without the costly sacrifice of loss in fidelity and tone range . . . without that weakening of power and dulling of low and high notes which owners of ordinary sets must suffer when hum is reduced in defiance of electrical research and experience.

See the Screen-Grid Radiola today. Hear it! Compare it! You'll see at once that it marks a great advance in the radio art. And then select the model that best suits your own requirements.

The complete line of RCA Radiolas includes ten models in three circuits, including Screen-Grid and Super-Heterodynes — and new Radiola-Phonograph combination sets, from $54 to $690.

RCA RADIOLA 44

Radio receiver utilizing Screen-Grid Radiotrons—high amplification and great selectivity. Alternating current operating from house circuit. Table cabinet of walnut veneer.

$75 (less Radiotrons)

RCA RADIOLA 46

Console cabinet model of Radiola 44, with RCA Electro-Dynamic speaker.

$130 (less Radiotrons)

RCA RADIOLA 47

The newest RCA "all-electric" development in Screen-Grid radio combined with the phonograph. Radio and Phonograph utilize the same improved built-in Electro-Dynamic reproducer. "Music from the air or records."

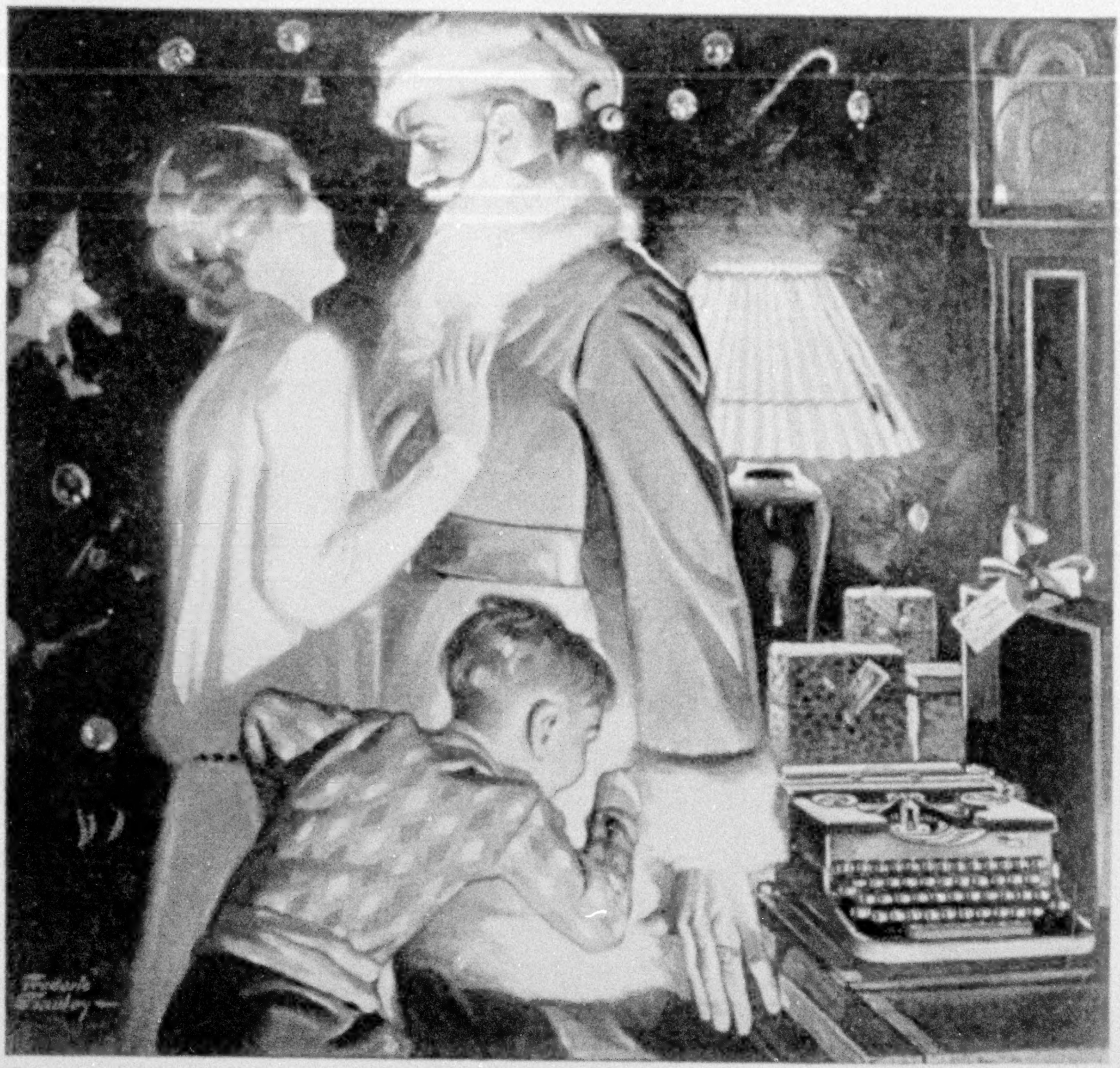
$275 (less Radiotrons)

RCA RADIOLA

MADE BY THE MAKERS OF THE RADIOTRON

Buy with confidence where you see this sign

RADIOLA DIVISION RADIO-VICTOR CORPORATION OF AMERICA



. . . . "IT'S A ROYAL PORTABLE"

And the young hopeful capers with gleeful excitement. Pleased and delighted, mother congratulates Santa upon his thoughtfulness. He wisely chose a Royal Portable Typewriter as the ideal Christmas gift for the family, knowing well that its writing convenience would bring daily enjoyment to one and all . . . The Royal Portable, compact, sturdy and so colorful, is amazingly simple to operate. Its lively, entertaining keys quickly and neatly type your every thought. This interesting way of writing stimulates enthusiasm for study hours at home, thus advancing the children in their progress at school . . . Finished in a variety of unique Duotones and other colorings, the Royal Portable is obtainable also in a distinctive new type face, "Vogue," for personal correspondence . . . This most exceptional of Christmas gifts is priced at only $60 complete with carrying case. Convenient monthly payments, if desired.

ROYAL TYPEWRITER COMPANY, Inc.
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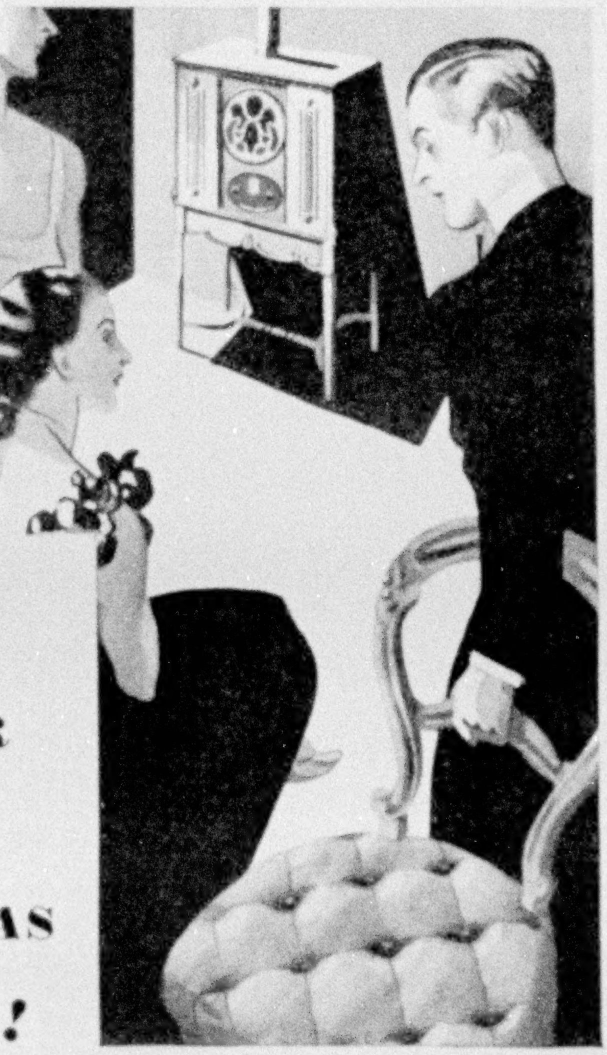
ROYAL TYPEWRITERS
Portable

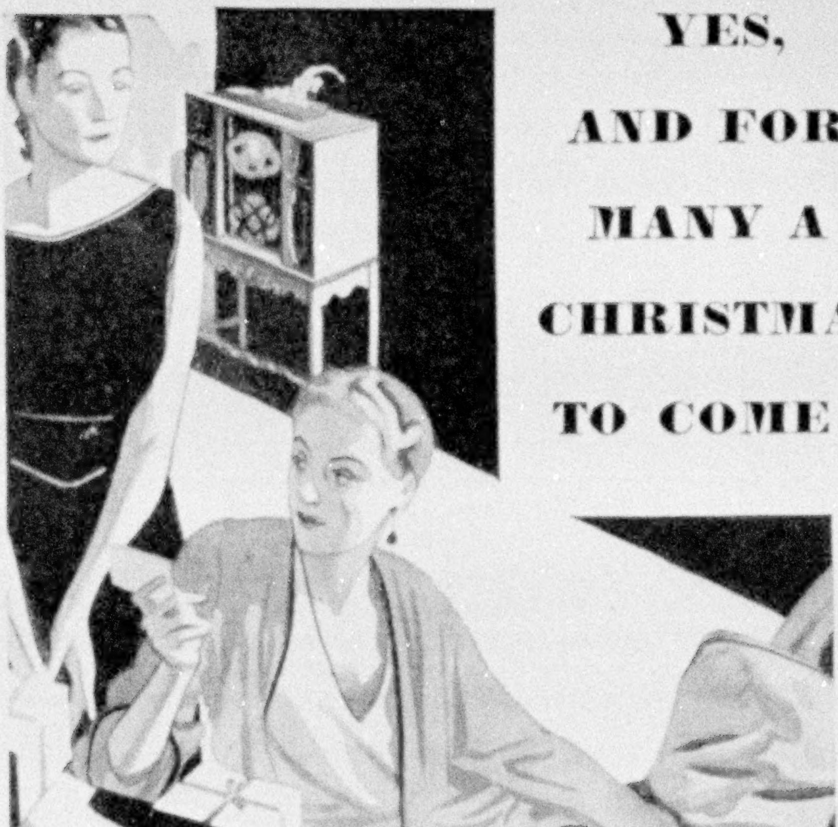
ATWATER KENT
RADIO
SCREEN-GRID

TRUE voices—the truth of music and of human speech! Power that hurdles horizons—fetches entertainment from the blue distance! Two—three—four—five years from now, you'll still be saying proudly, "Listen to *that!* It's the Atwater Kent that came to us at Christmas in 1929!"

What could possibly mean more to the whole family? Imagine the enduring pleasure of the gift that goes on and on, pouring forth its music, giving companionship through the years!



**YES,
AND FOR
MANY A
CHRISTMAS
TO COME!**

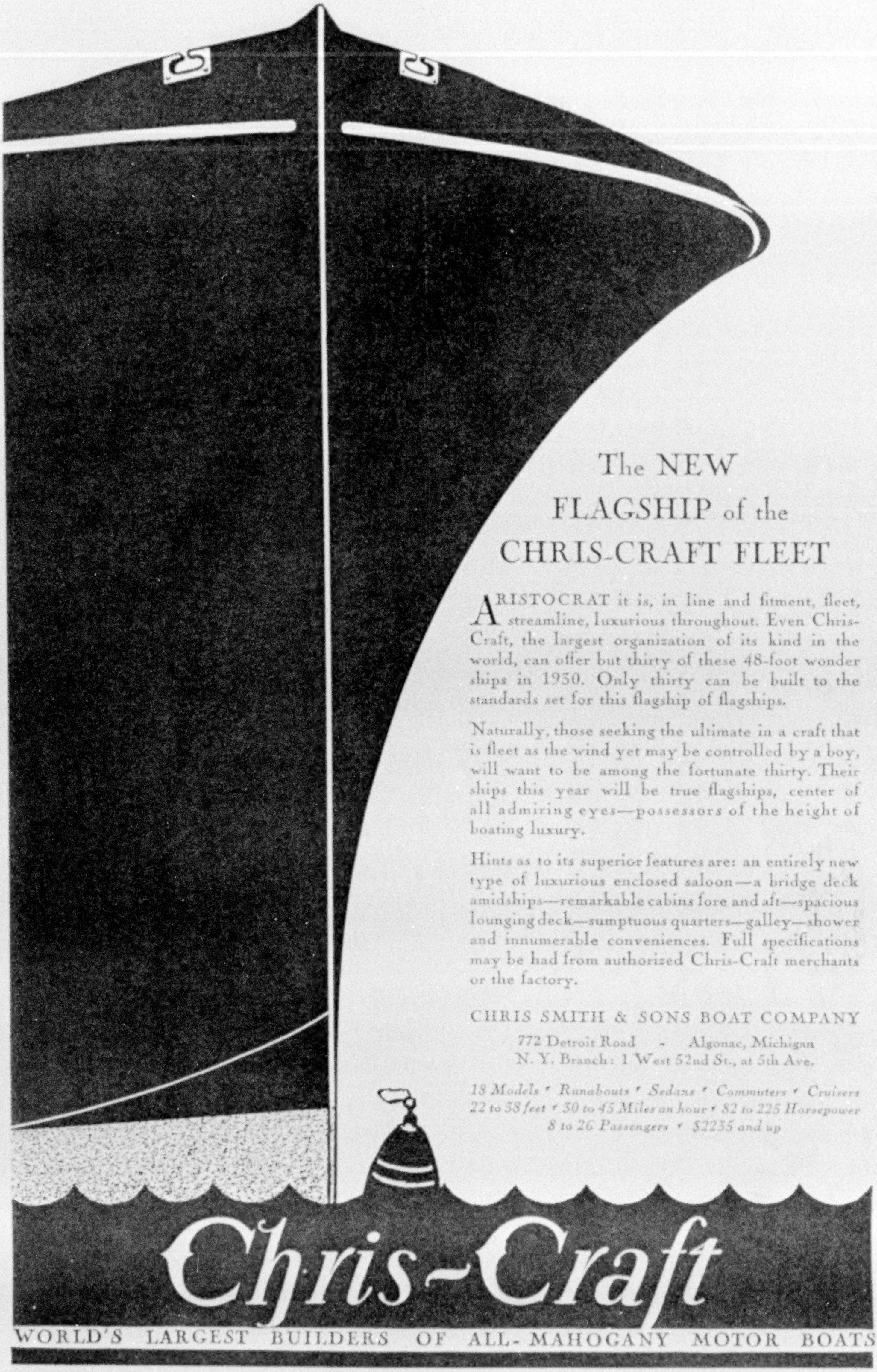


JUST a radio will never do. Only an Atwater Kent can give you Atwater Kent reality of tone—with the vastly more powerful Screen-Grid tubes used as Atwater Kent uses them.

You are not restricted to one or two cabinets. Choose your radio furniture just as you choose other beautiful things for your home. In any cabinet, you get Atwater Kent Screen-Grid performance—and that *never* varies!

On the Air—*Atwater Kent Radio Hour, Sunday evenings, 9:15 (Eastern Time), WEAF network of N.B.C. Atwater Kent Mid-Week Program, Thursday evenings, 10:00 (Eastern Time), WJZ network of N.B.C.*

ATWATER KENT MANUFACTURING COMPANY *A. Atwater Kent, Pres.* 4822 Wissahickon Ave., Philadelphia, Pa.


Chris-Craft
WORLD'S LARGEST BUILDERS OF ALL-MAHOGANY MOTOR BOATS

The NEW
FLAGSHIP of the
CHRIS-CRAFT FLEET

ARISTOCRAT it is, in line and fitment, fleet, streamline, luxurious throughout. Even Chris-Craft, the largest organization of its kind in the world, can offer but thirty of these 48-foot wonder ships in 1930. Only thirty can be built to the standards set for this flagship of flagships.

Naturally, those seeking the ultimate in a craft that is fleet as the wind yet may be controlled by a boy, will want to be among the fortunate thirty. Their ships this year will be true flagships, center of all admiring eyes—possessors of the height of boating luxury.

Hints as to its superior features are: an entirely new type of luxurious enclosed saloon—a bridge deck amidships—remarkable cabins fore and aft—spacious lounging deck—sumptuous quarters—galley—shower and innumerable conveniences. Full specifications may be had from authorized Chris-Craft merchants or the factory.

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772 Detroit Road - Algonac, Michigan
N. Y. Branch: 1 West 52nd St., at 5th Ave.

18 Models • Runabouts • Sedans • Commuters • Cruisers
22 to 38 feet • 30 to 45 Miles an hour • 82 to 225 Horsepower
8 to 26 Passengers • $2235 and up

WHOSE GUIDING HAND?

As much as a pilot fears anything, he fears fog! . . . The moment the dank coolness of a cloud bank enfolds him, he is blind and lost, unless some unseen hand is stretched forth to guide him! . . . Storm-tossed, high above the dark earth, with a rolling sea of blinding vapor below him, where can he turn in the empty sea of the sky for help and guidance to clear flying and safe landing? . . .

The Weather Man at Washington who watches the pathways of ships at sea . . . who warns the traveler on his way . . . who tells the farmer clearly when danger to his crops is rolling towards his horizon . . . *the Weather Man is now lifting his eyes to the pathways of the sky!*

A system of hourly weather reports issued by the United States Weather Bureau will soon make it possible for a pilot taking off in blinding snow or fog to know with certainty that at a definite distance beyond the clouds both sky and earth are clear and sunny. At every airport reached by radio, telegraph, or telephone, government reports will tell exactly every few hours what weather conditions are at all points of the compass and at any distance beyond the immediate horizon. . . .

This latest marvel of governmental efficiency overcomes the last great obstacle to the commercial efficiency of aviation. . . . A hundred years from now the same storms and fogs will draw perilous nets between the harborless sky and the safe anchorage of clear, firm land. *But all the vagaries of the weather will be charted as clearly as the tides and currents of the ocean and a guiding hand will help the pilot always on his way. . . .*

Twenty-eight years ago a black hurricane burst out of the Gulf of Mexico upon unsuspecting and unprepared Galveston, *and six thousand people perished in its path.* Last year when an even worse hurricane burst out of the South Atlantic, for ten days . . . from the hour it was born in a sluggish whirlwind in the middle of the sea until it died away in light breezes in Canada . . . the Weather Man at Washington followed every riffle of this terrific storm. Information had flown in to him by radio and telegraph . . . his well-conceived warnings were roared forth from the broadcasting station at Arlington . . . and when the storm burst *the seas had been cleared of shipping and all coastal cities were braced and ready.*

Today far greater precision is being attained in weather forecasting—so that every breeze that blows may soon be charted for the guidance of the commercial pilot!

Ford all-metal, tri-motored planes are flying safely in continuous service, carrying passengers, mail, express and freight, not only over lines that crisscross the United States, but also in Mexico, South America, and as far south as the Antarctic Circle.

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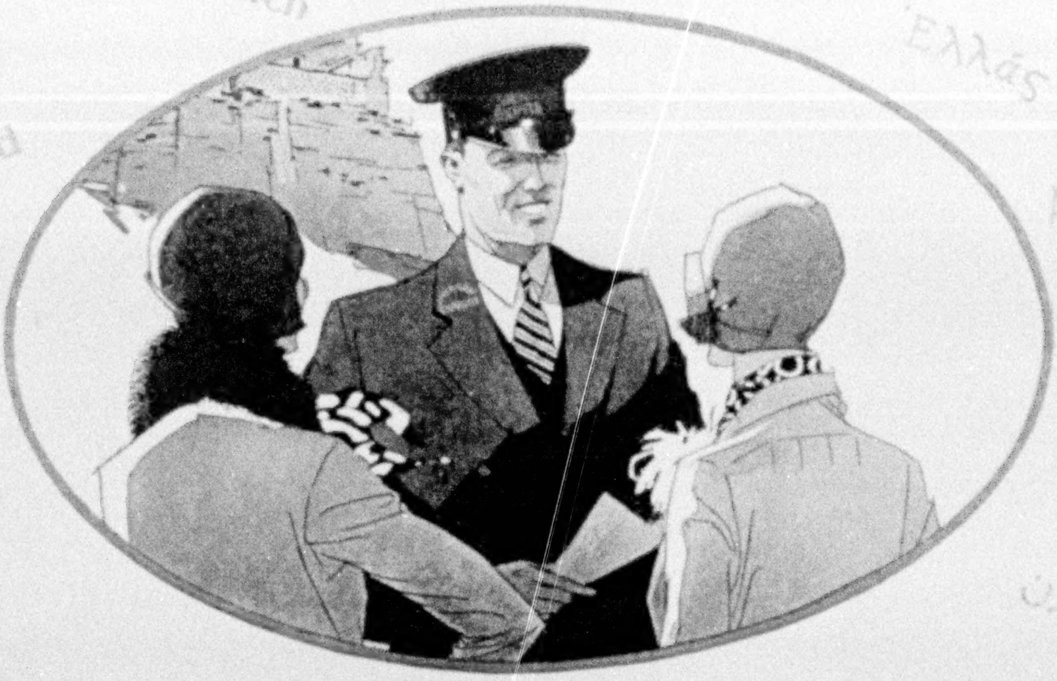

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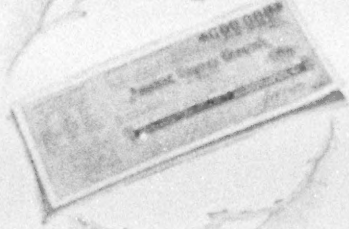
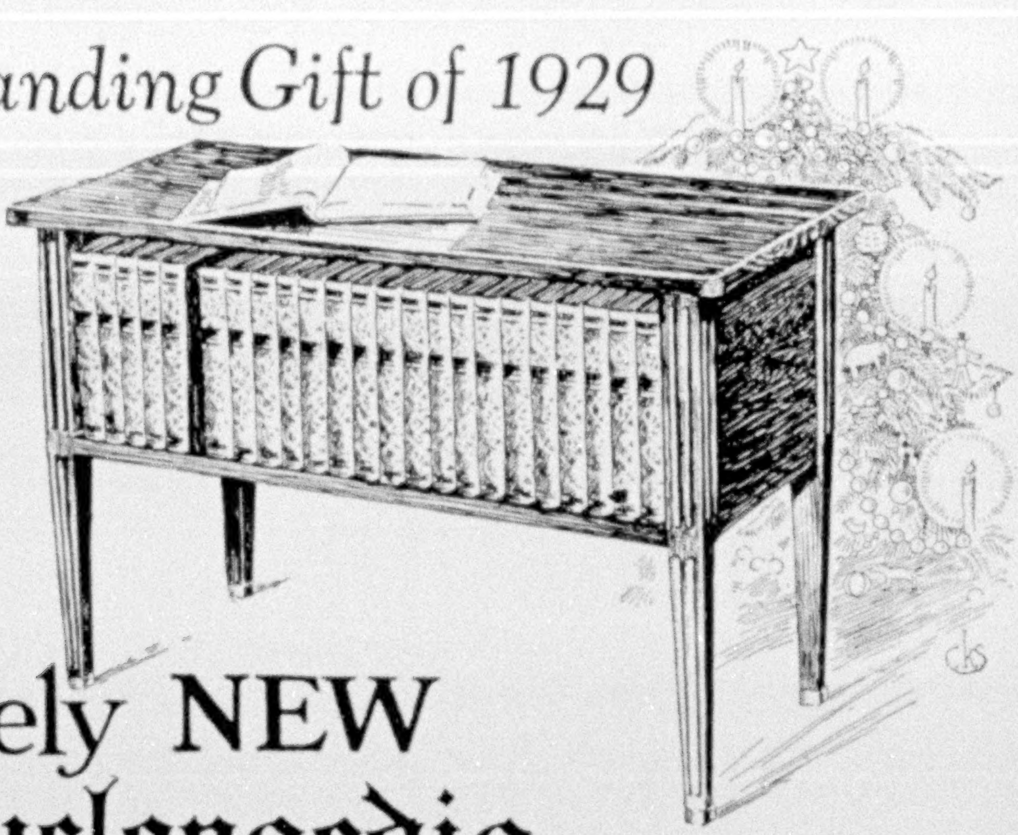


The Outstanding Gift of 1929



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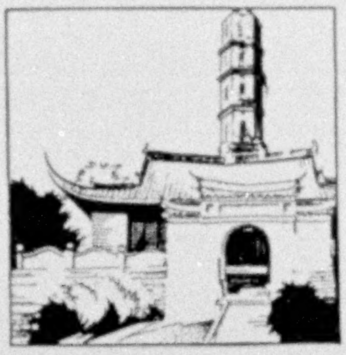

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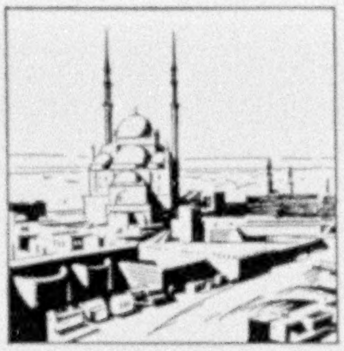

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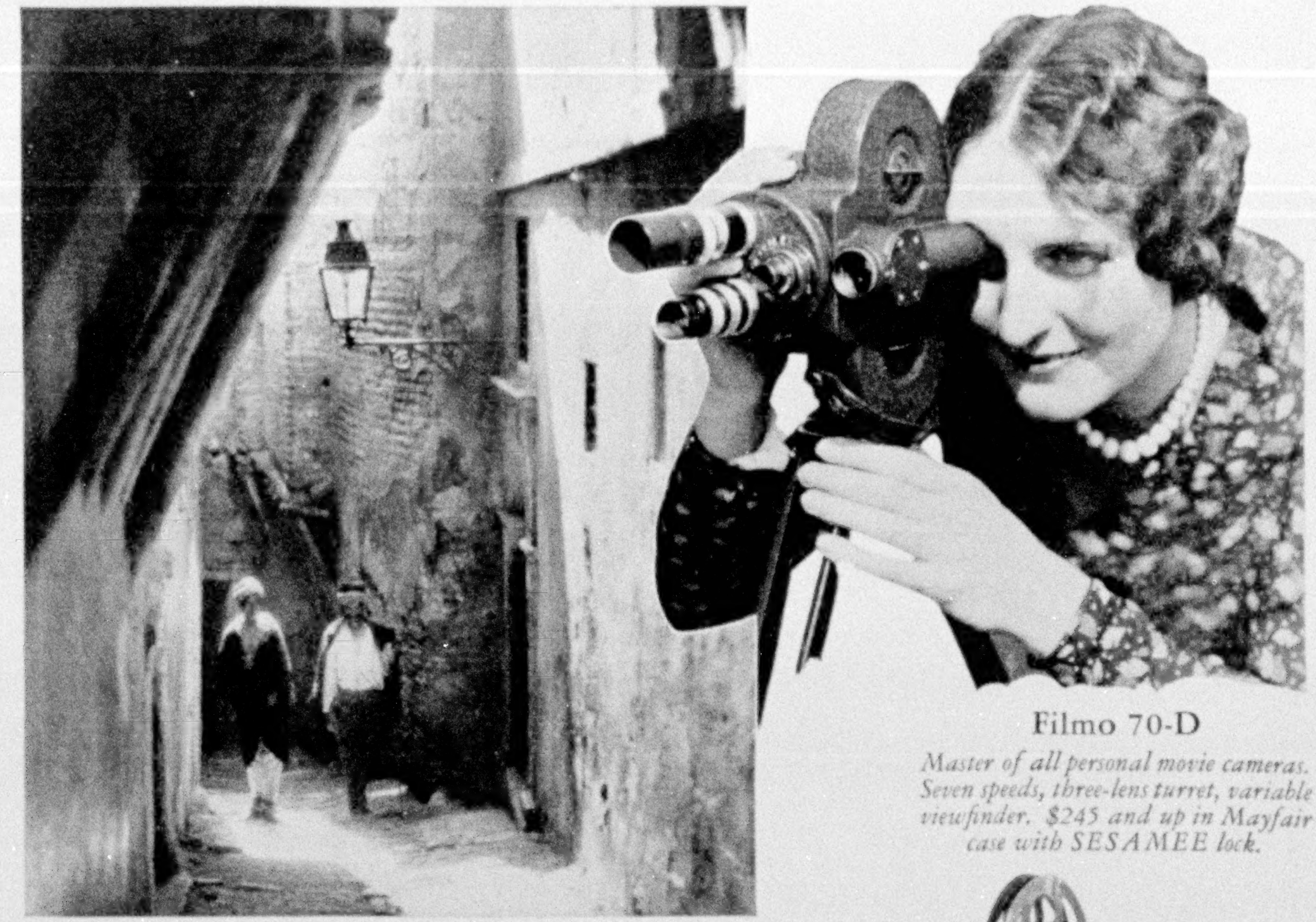

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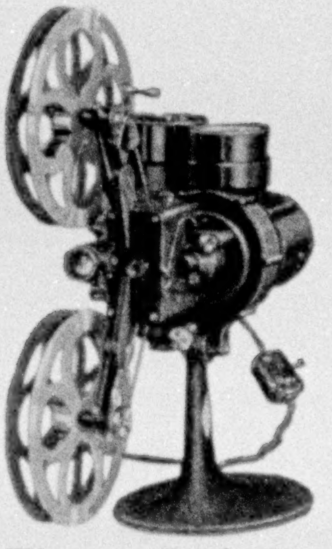

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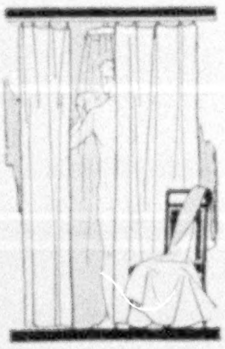

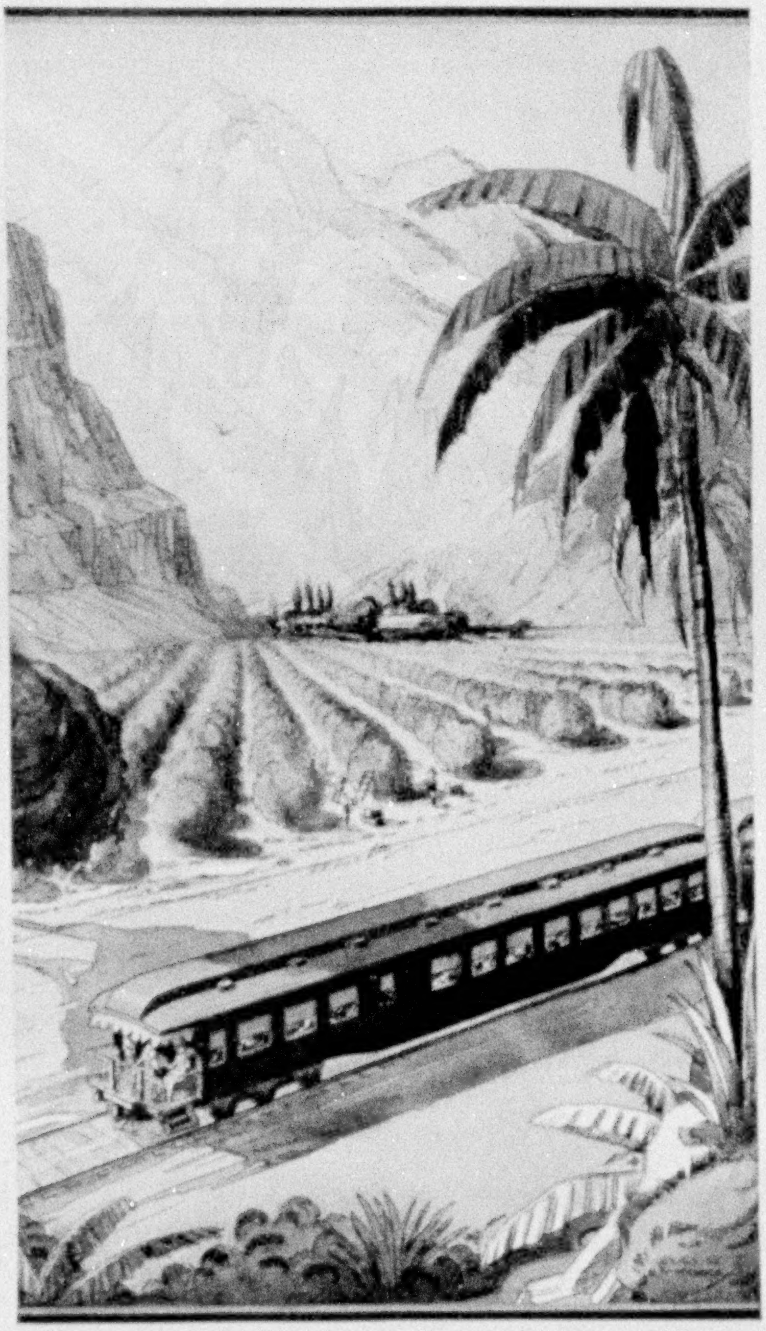

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The Los Angeles Limited — Union Pacific's famous train to Southern California — offers those extras which add so much to one's enjoyment of travel, *at no extra cost.*

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Including the new 58 hour extra fare Overland Limited, finest and fastest train between Chicago and San Francisco; the 63 hour all-Pullman San Francisco Limited; the Gold Coast Limited; Continental Limited; Pacific Limited; Pacific Coast Limited.

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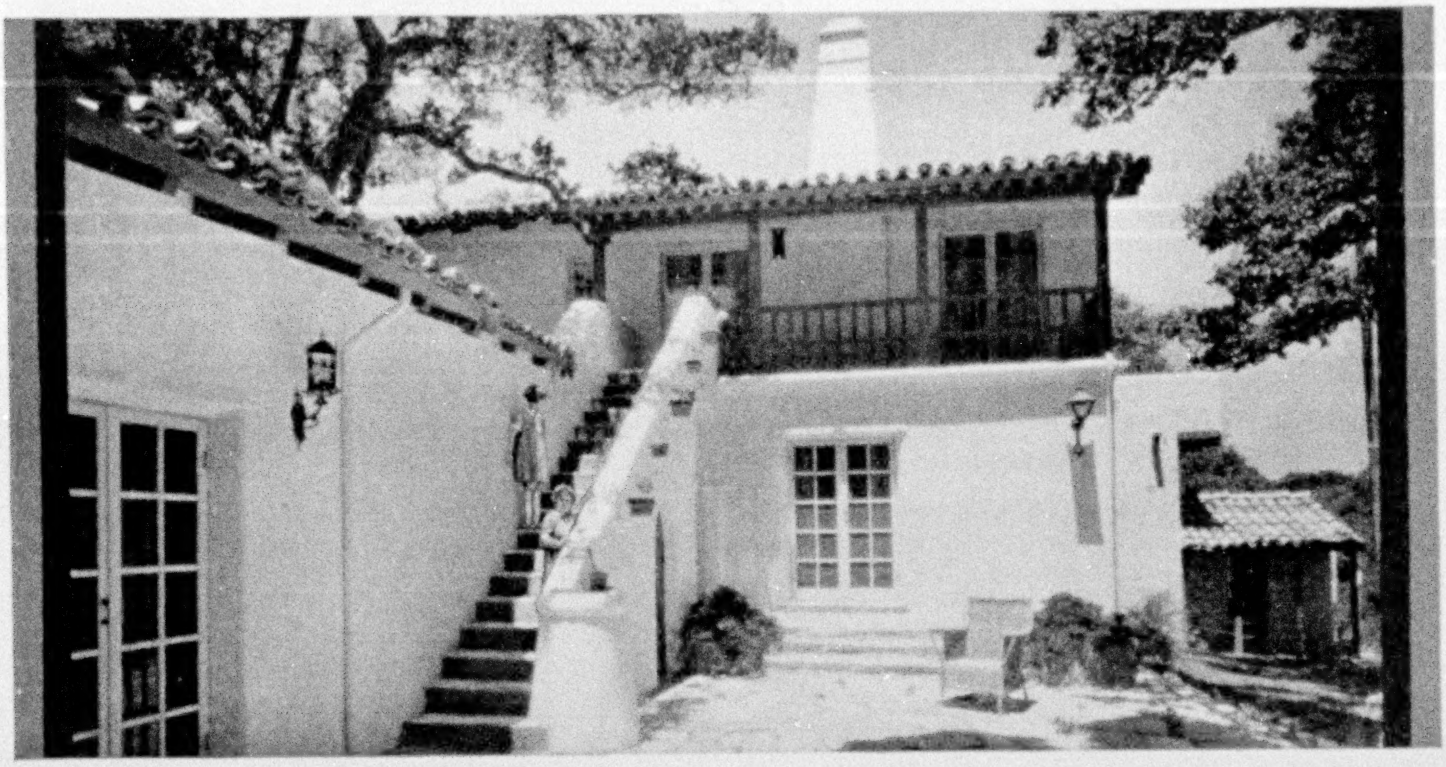

They've found the West "Where life is better"

Let California show it to you this winter

California invites you to discover the secret of this land where thousands, who came first to visit, have returned to live.

A June-like winter is not the only lure. True, an all-year balmy climate with a marvelous variety of outdoor pleasures is one reason for this westward movement. You can play one day on green sun-warmed golf courses and the next in snowy mountain theatres. Del Monte, Lake Tahoe, Yosemite, San Francisco, are but a few hours apart, here in California . . . Yet there is another, greater thing that's brought these people here.

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What other gift so choice for only fifteen dollars? What so prized and desirable? Or so perfect an addition to your own appointments?

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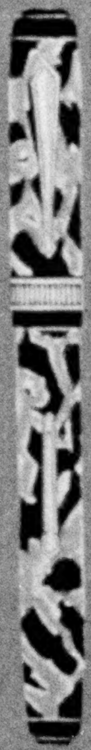

NACRE
The pen . $10
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JET
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The pencil $5

EMERALD
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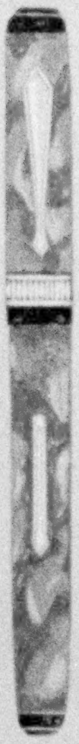

TURQUOISE
The pen . $10
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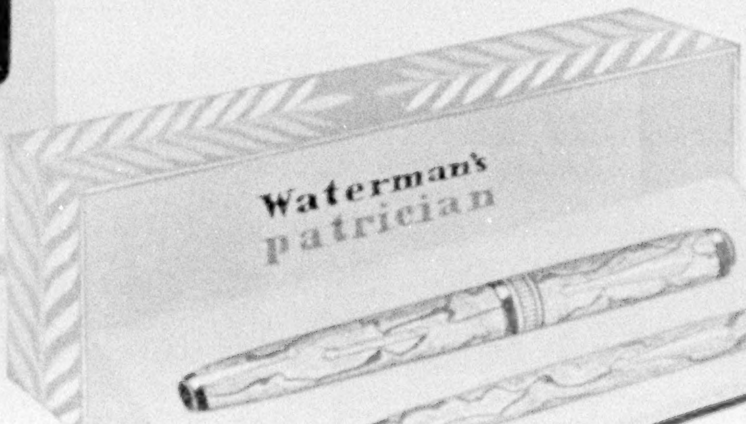

ONYX
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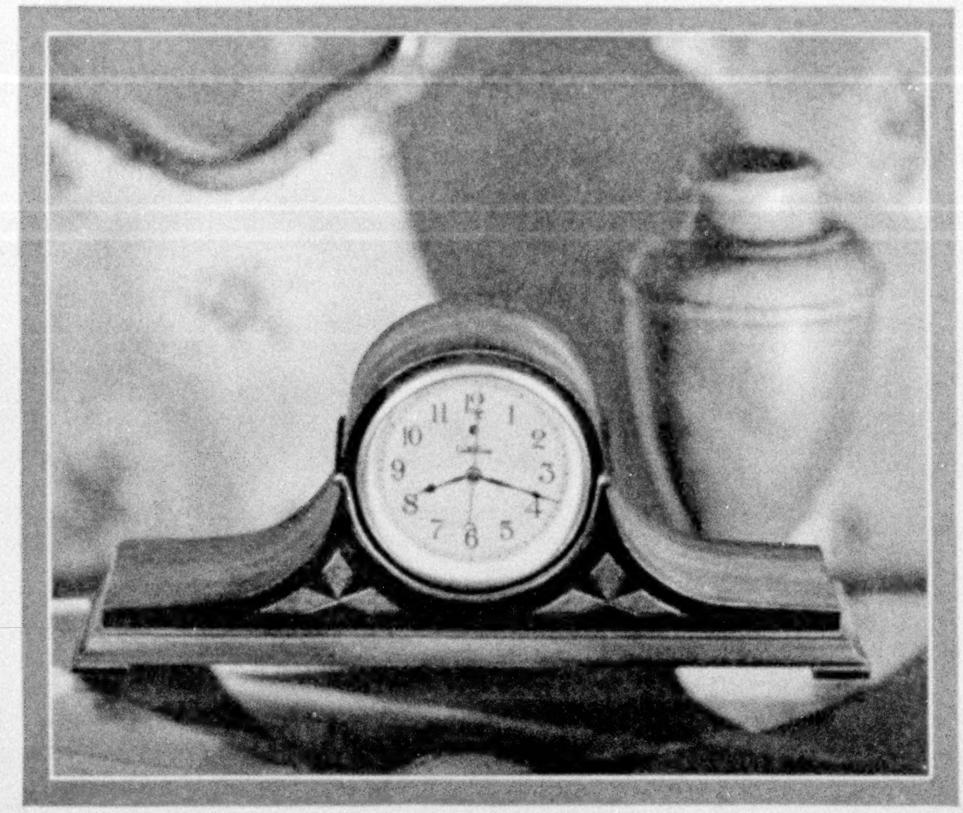

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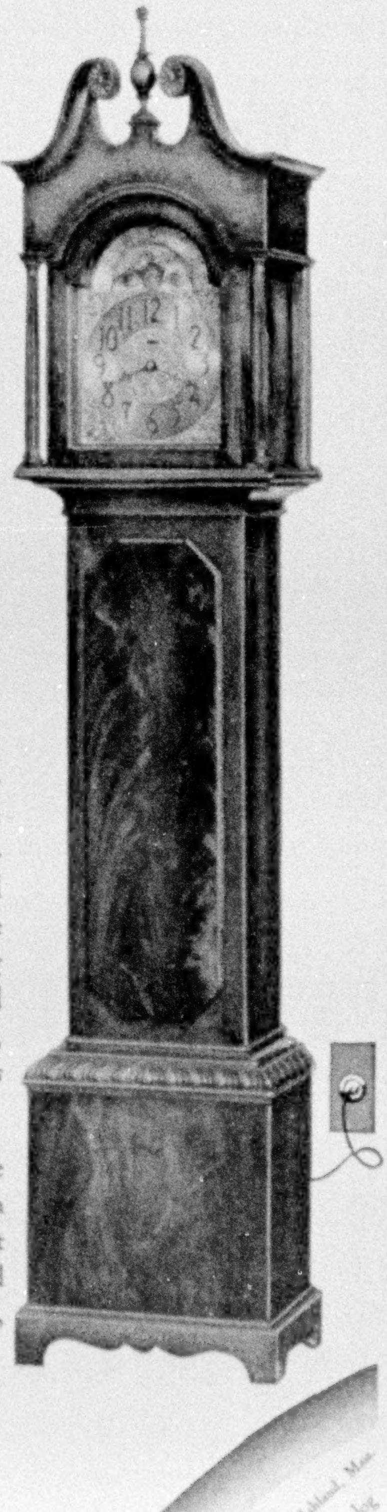
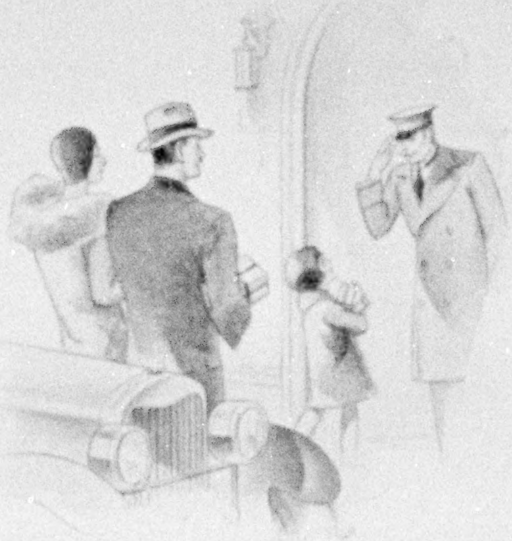


The Modern Gift for the Modern Home



WOULDN'T you be glad to present a *unique* gift—sure to be both a pleasure and a service to all the family—a delightful, lasting reminder of your Christmas thought? You will find it in one of these modern, Telechron Motored electric clocks! They need no winding — no regulating — yet give *precise* time, constantly, by simply plugging into an electric outlet! The tiny, patented Telechron Motor drives the hands silently, continuously, and the *electric current keeps it correct!*

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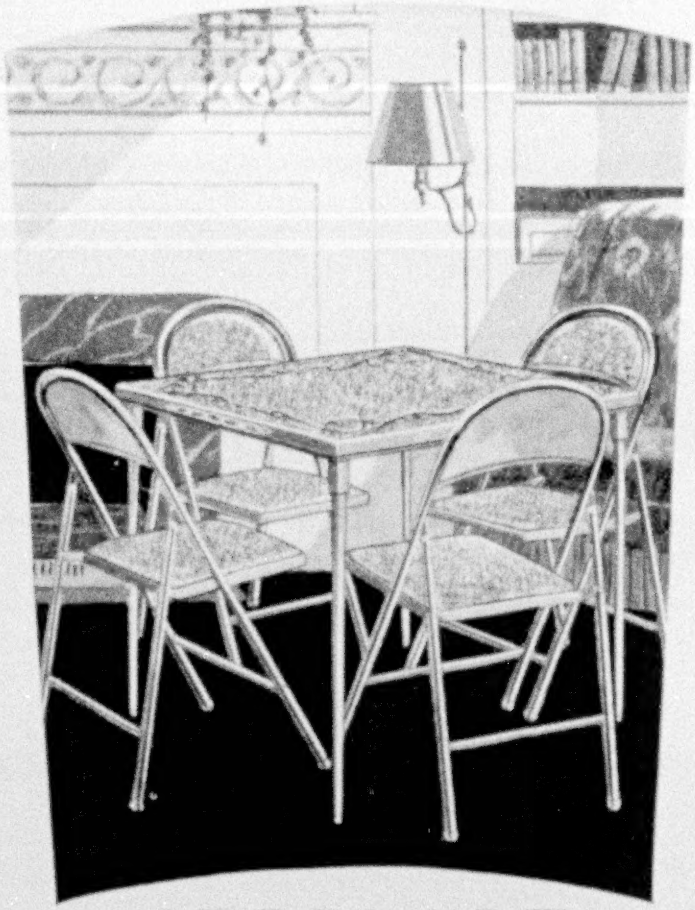

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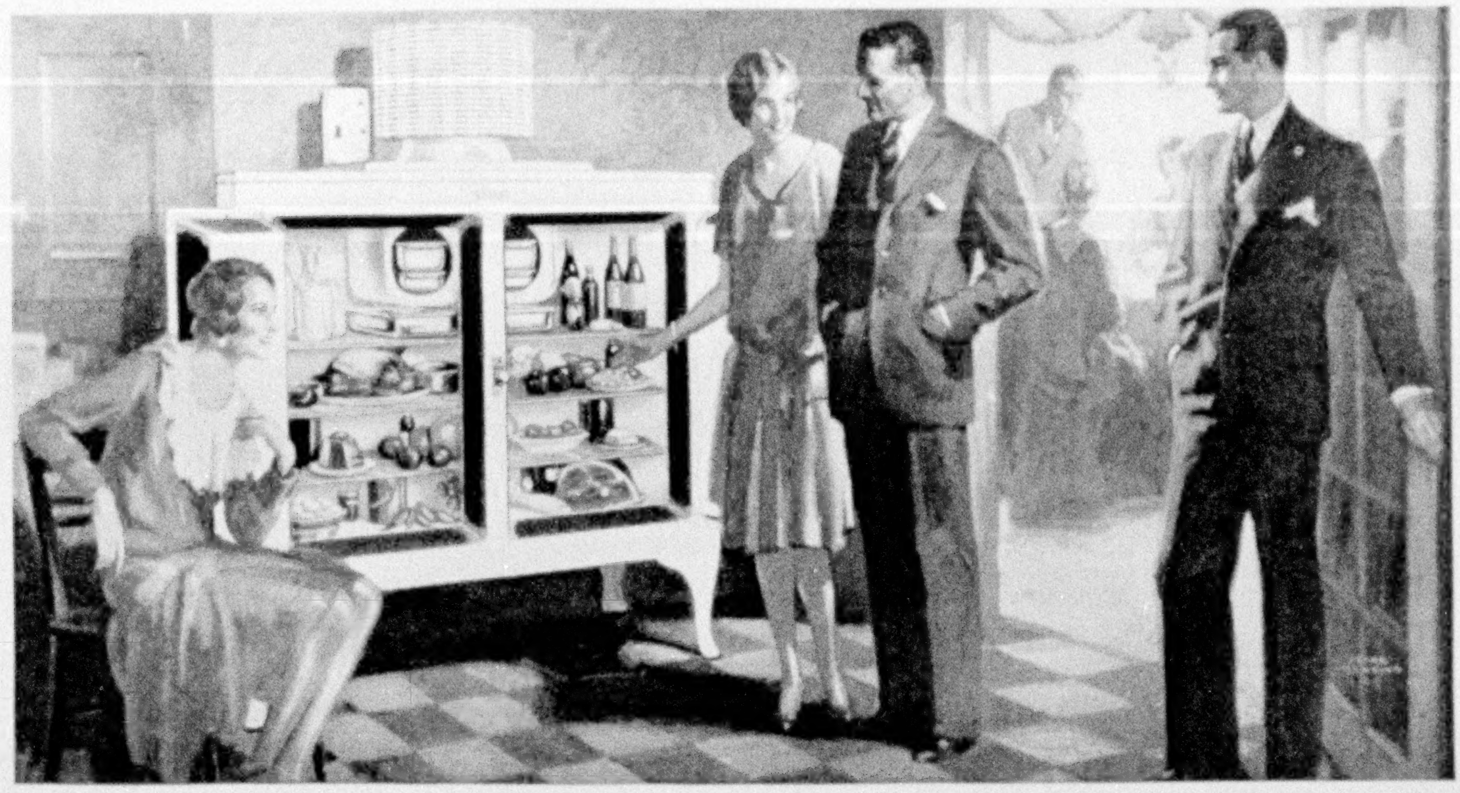

Happy to own it . . . proud to show it

Really, you can't blame her. Who wouldn't drag her friends out into the kitchen to show off her new General Electric? There it stands, gleaming white, strong as a safe, incredibly quiet . . . the envy of all who see it.

For a gift that gives all-year usefulness, that makes every-day tasks lighter, that safeguards health, the General Electric is really ideal. It makes a generous supply of ice cubes and, of course, freezes those luscious desserts which hostesses enjoy serving.

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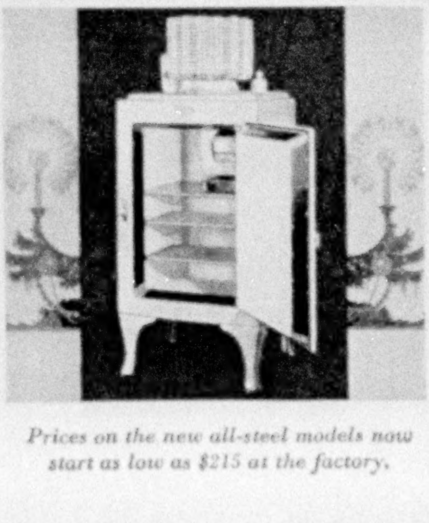

Prices on the new all-steel models now start as low as $215 at the factory.

And the General Electric is the only refrigerator which has all its mechanism mounted on top in an hermetically sealed steel casing . . . out of the way, dust-proof, needing no oiling . . . leaving the greatest cabinet area for food storage . . . and allowing the heat to rise above the cabinet—not up through it. It has an accessible freezing regulator and it creates absolutely no radio interference.

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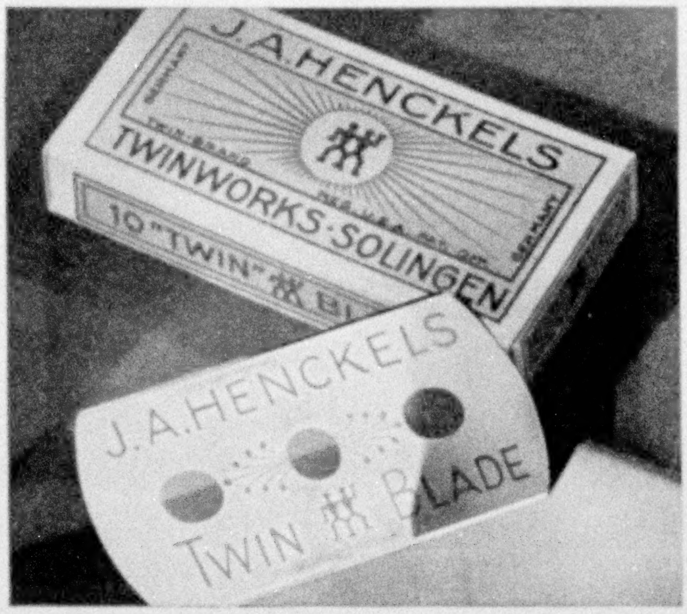
For complete information write Electric Refrigeration Dept., General Electric Company, Hanna Bldg., Cleveland, Ohio. Ask for Booklet R-12.

GENERAL ELECTRIC
ALL-STEEL REFRIGERATOR

Give *yourself* this Christmas Gift



. . . a new experience in shaving

To many men no more need be said than that Twin Blades are made by J. A. Henckels, world famous cutlery makers of Solingen.

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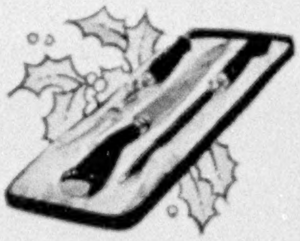
FINE CUTLERY**

For distinctive Christmas gifts you will find at your J. A. Henckels dealer a wide and varied assortment of the world famous Twin Brand Cutlery.



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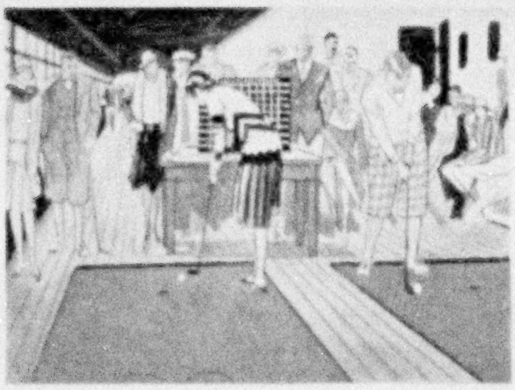

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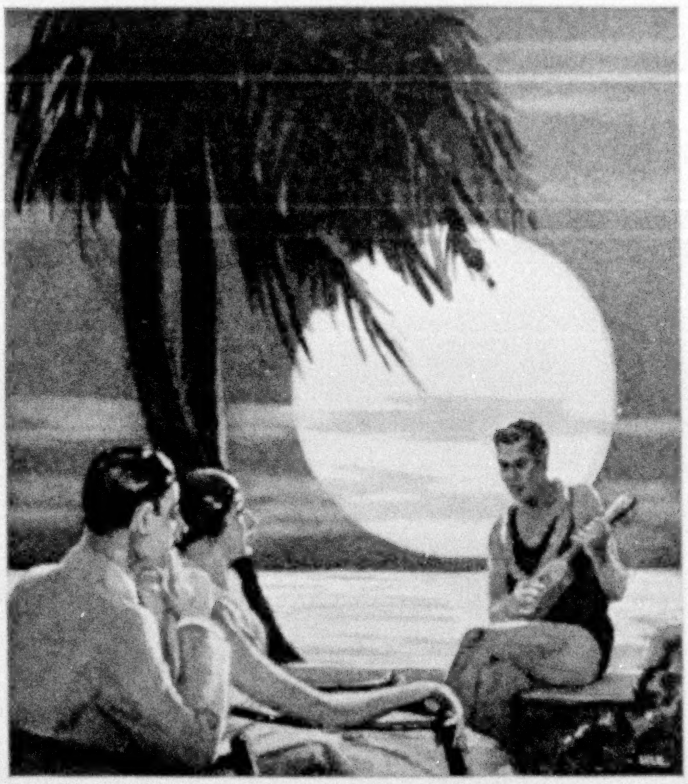

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And remember, Hawaii is part of the United States. There is no bother of passports or other formalities.

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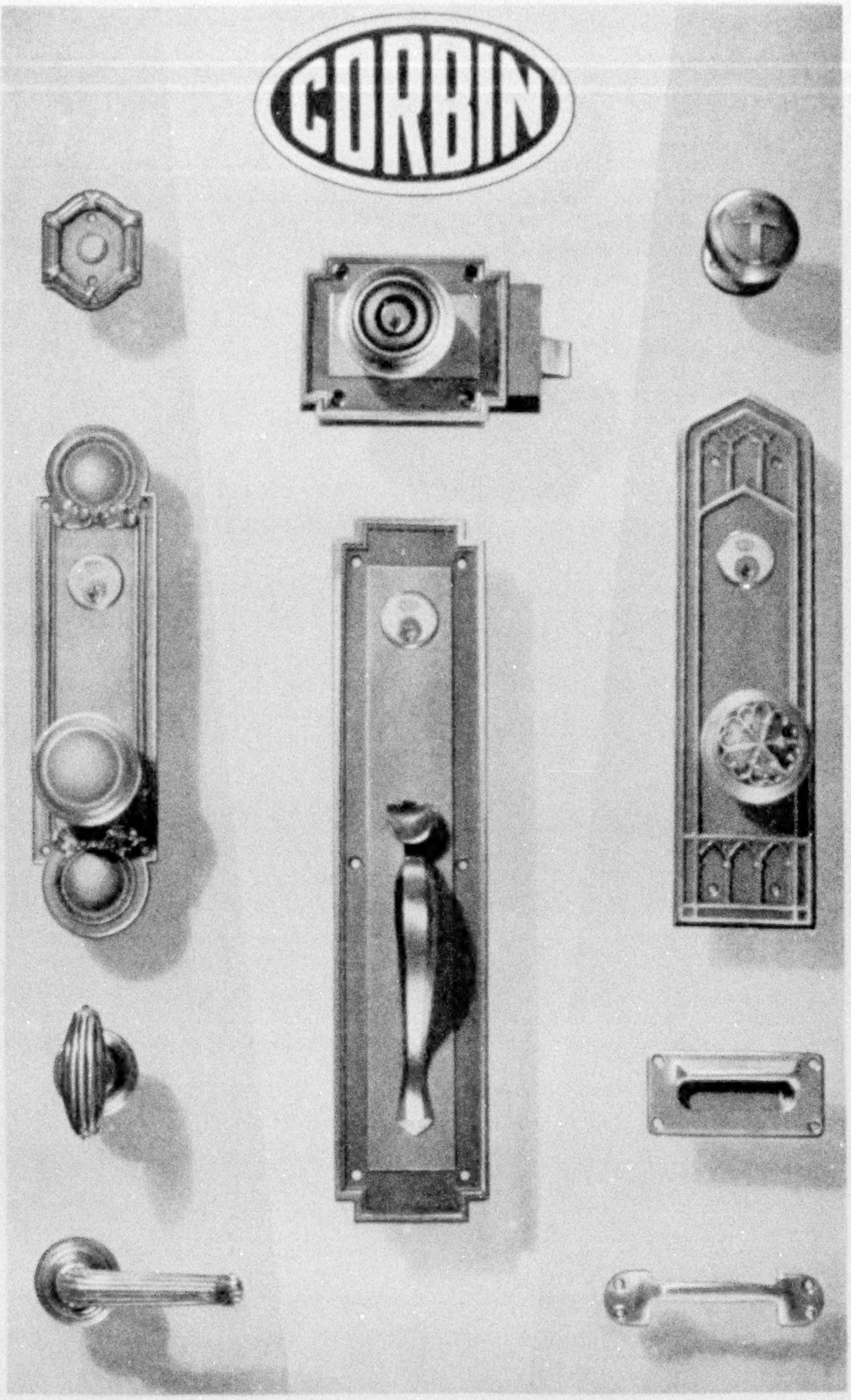

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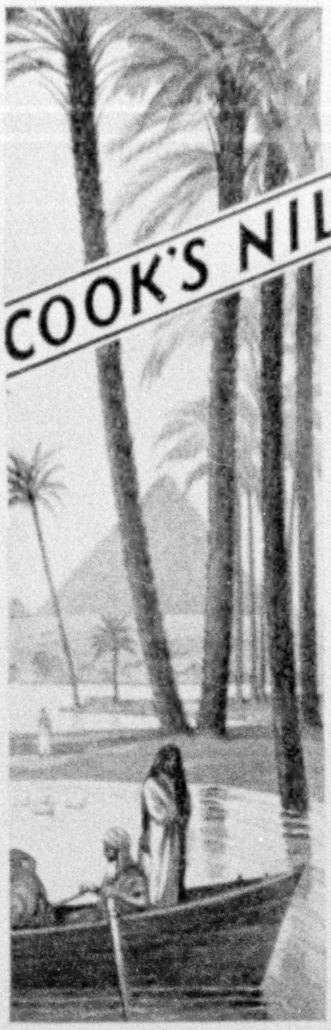

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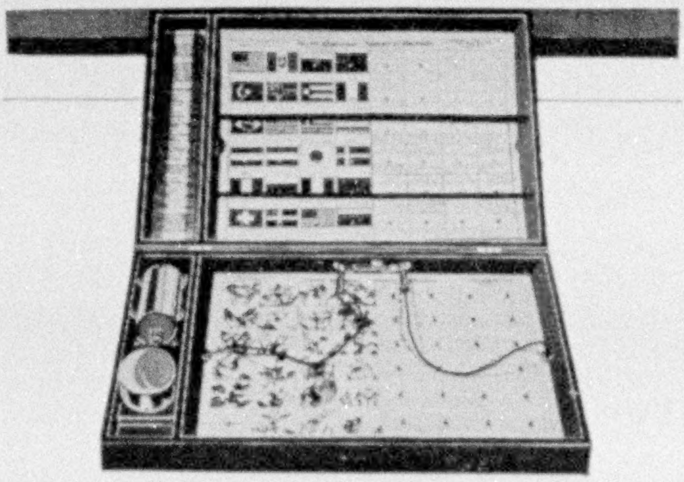

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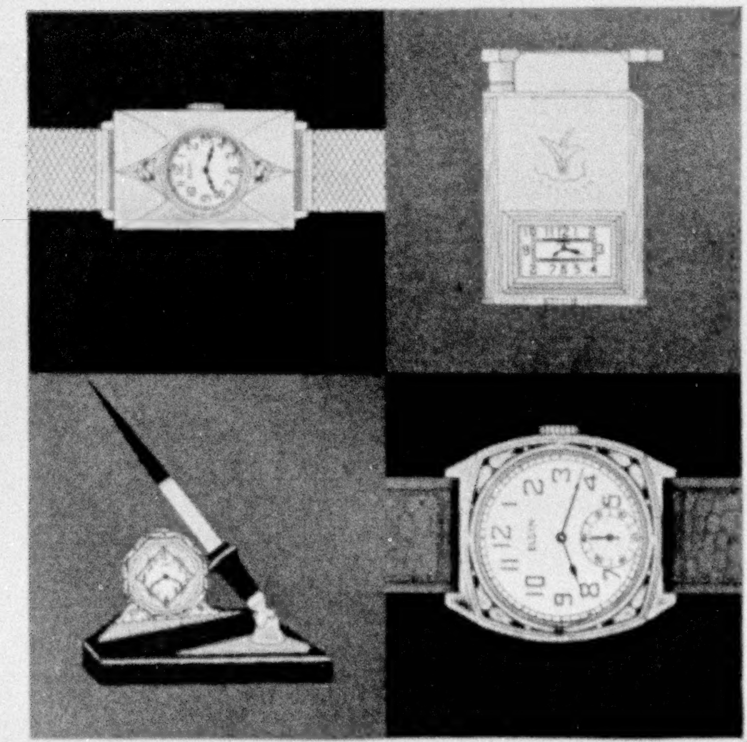
It's your Move . . . *and you can't lose if you give or get an Elgin for Christmas*



Christmas came long before watches, but ever since the two have been on earth together, they've been together inseparably, it seems. Perhaps it's because a watch carries your present sentiments long into the future, saying with every beat "may every hour I record be happy as this Christmas day of my presentation." And this is the best Christmas in sixty years for choosing an Elgin. More styles. Prices in a closely ascending scale, from $15.00 to $650. A new Elgin watch family, the largest in the world, but still backed by the old Elgin tradition of fine timekeeping service and an unconditional guarantee.

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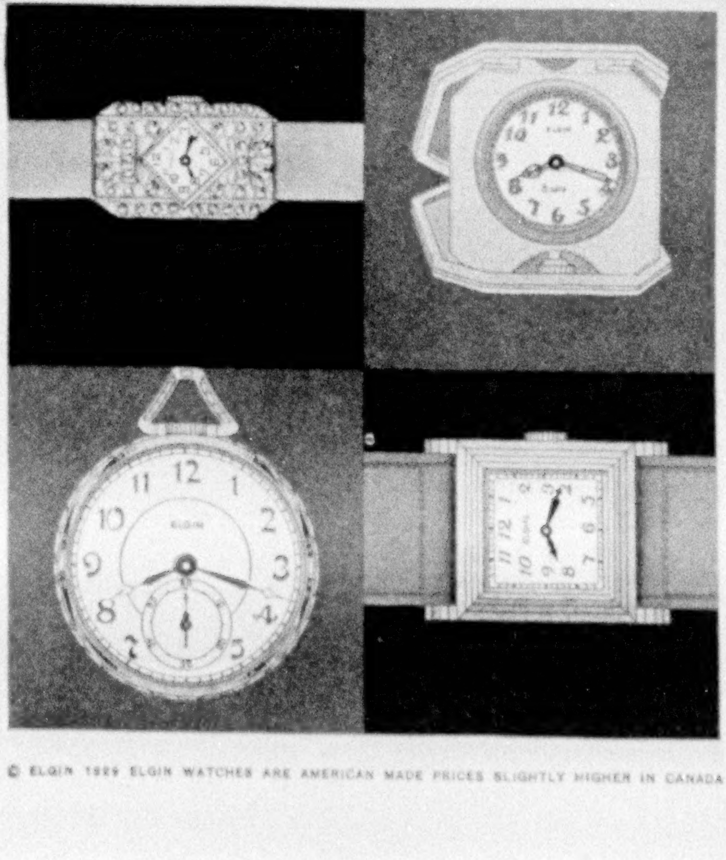

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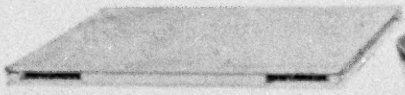

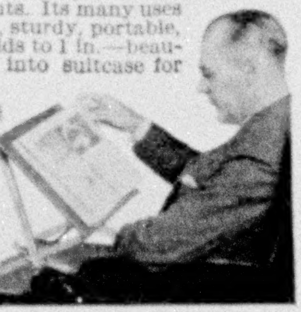

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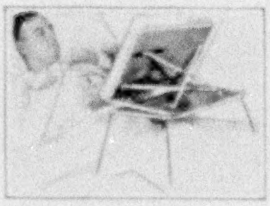

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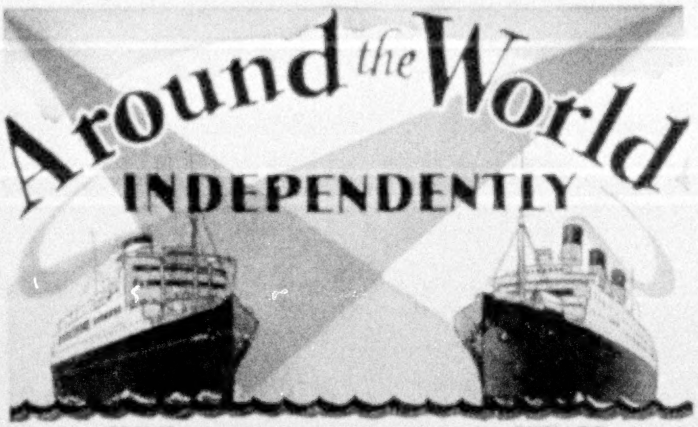

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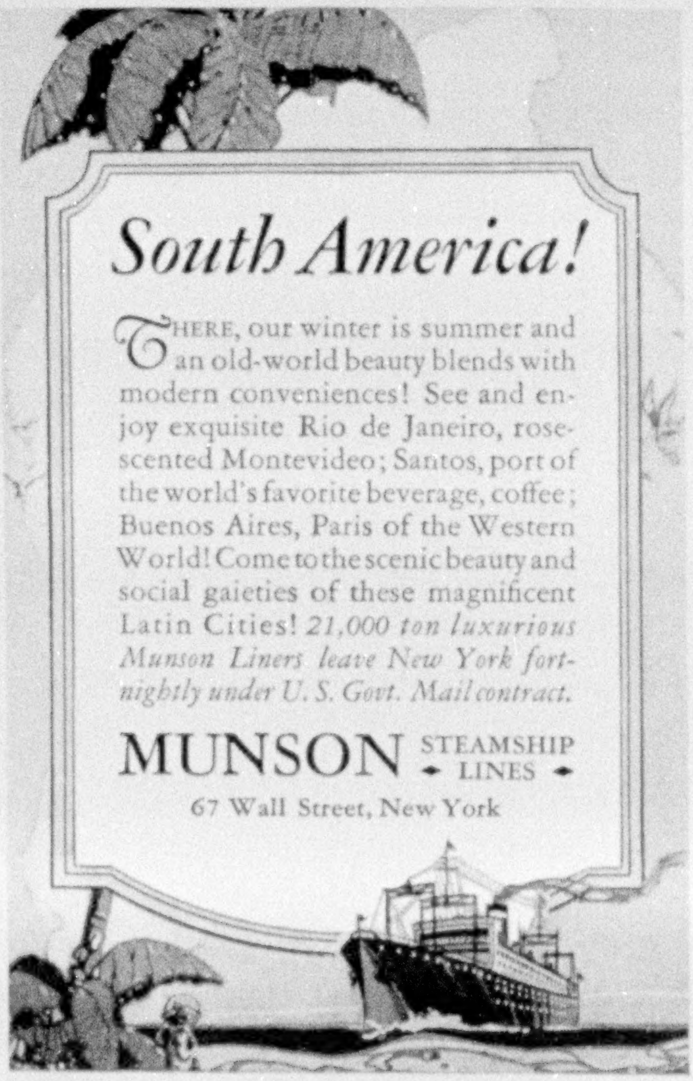

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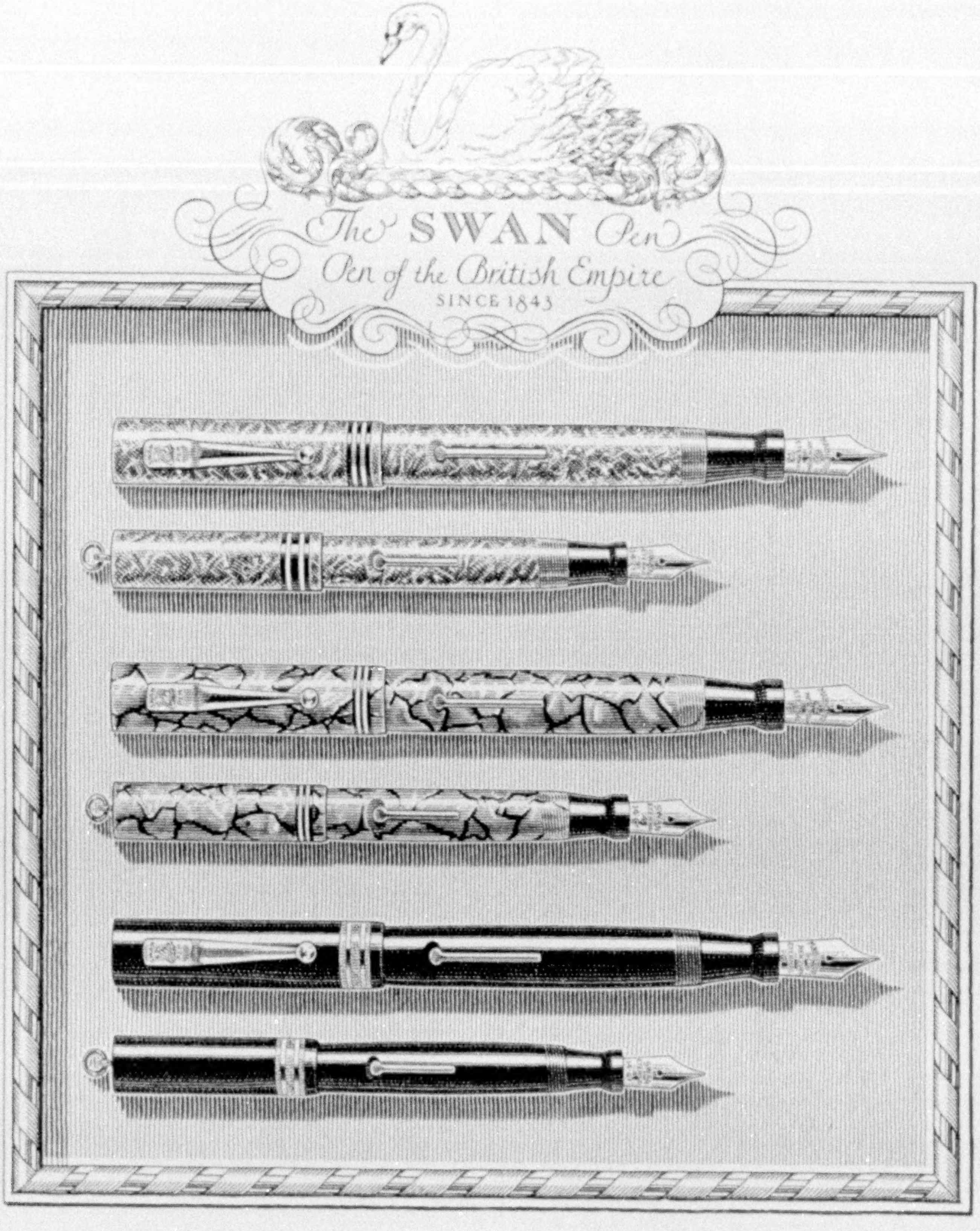
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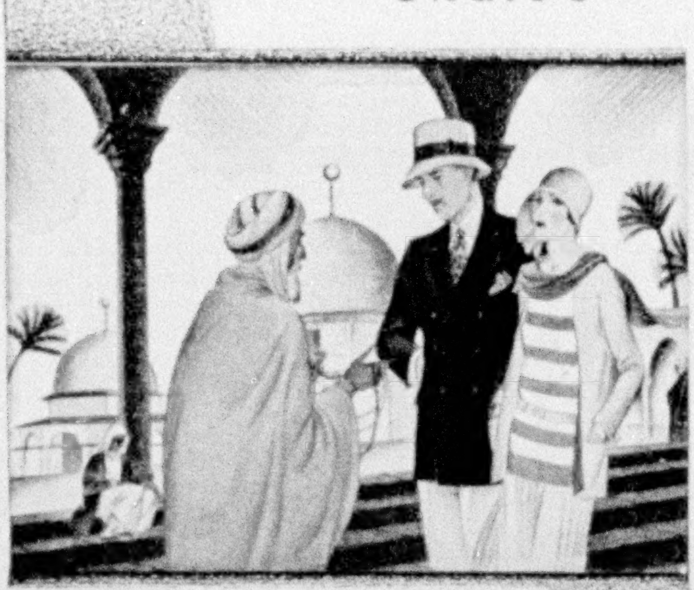

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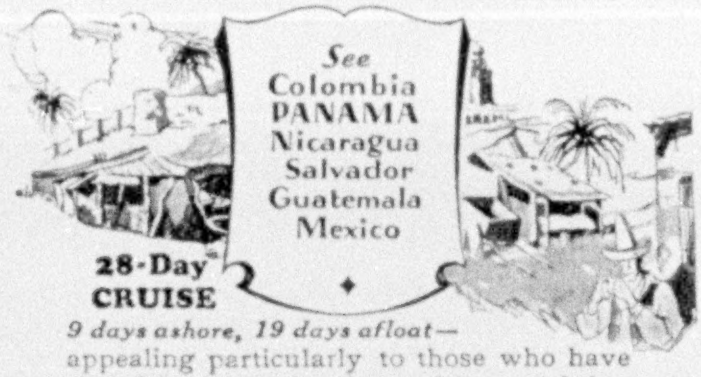

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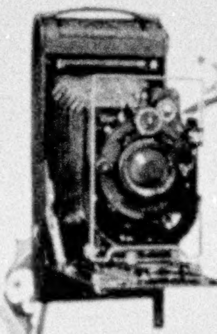

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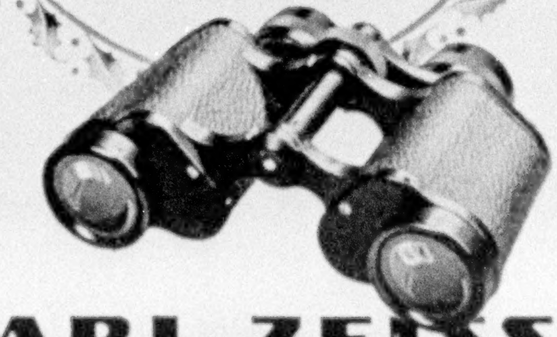

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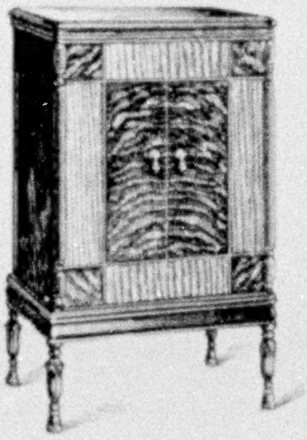

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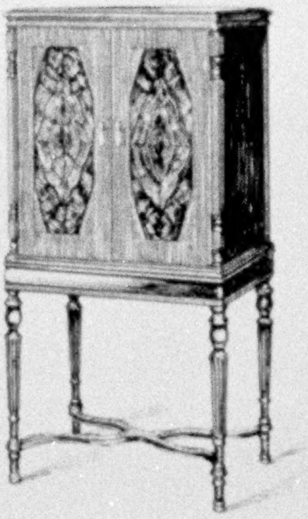

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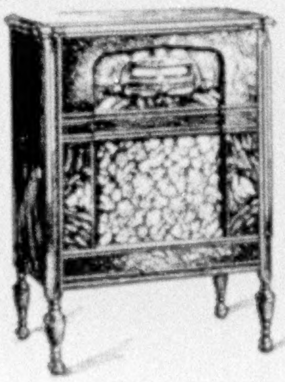

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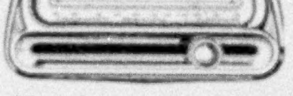

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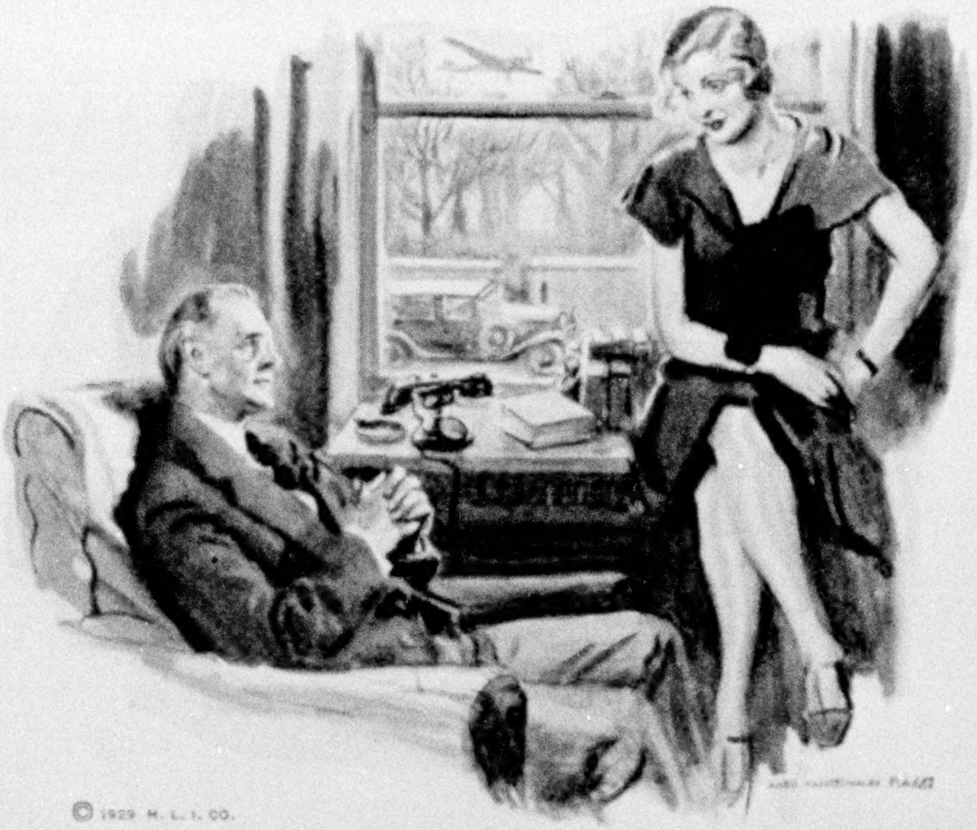
When Age Chuckles

"YOU are the youngest looking grandfather I ever saw. What's the secret?" "My dear, two things. The good health that I have worked for and won—and a keen interest in life. With books, music, sports, travel, inventions—each day brings something new. I want to see what will follow the telephone, radio, automobile, aircraft—what electricity will do next. . . ."



© 1929 M. L. I. CO.

No longer do scientists accept the idea of a fixed "span of life". They know that the average length of life is longer in some countries than in others. They know that babies fare more safely in the world—that people everywhere face fewer dangers today from contagious and other diseases.

While the average length of life has increased by 10 years since 1901, the improvement has been achieved mainly among the younger ages, leaving as our most pressing problem the protection of the lives of those who have already passed middle age.

One by one the perils which formerly caused untimely deaths are being conquered. "Witches" are not burned nowadays to stop plagues. On the other hand, sanitation, vaccination, inoculation and other scientific means are employed to prevent most of them.

People are learning the effect of fresh air, sunshine, cleanliness, proper breathing and exercise, sleep and a well-balanced diet.

THE LIGHT THAT NEVER FAILS

An annual medical examination for the discovery and correction of physical impairments before they have progressed too far to be remedied will keep the body sound.

In the United States and Canada there are more than 2,500,000 people between 70 and 80 years of age; more than 600,000 between 80 and 90; fifty-odd thousand between 90 and 100; and about 5,000 past the century mark.

The person who plans wisely to live to a happy and ripe old age never forgets that the mind is a powerful influence and that physical troubles are apt to follow a morbid viewpoint.

The world is tingling today with promise of future marvels even more wonderful than those we now know. Live to enjoy them.

* * *

You will find that the Metropolitan booklet, "Health, Happiness and Long Life", will help. Ask for Booklet 129-N. Mailed free.

METROPOLITAN LIFE INSURANCE COMPANY

FREDERICK H. ECKER, PRESIDENT

ONE MADISON AVE., NEW YORK, N. Y.

Whitman's

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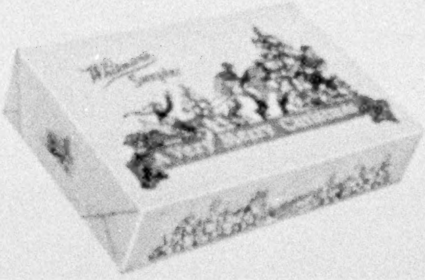
for your Christmas list



America's favorite in a new, gay, festive wrapper that carries your "Merry Christmas" in a delightful way.

Whitman's
Sampler
Chocolates & Confections

The SAMPLER

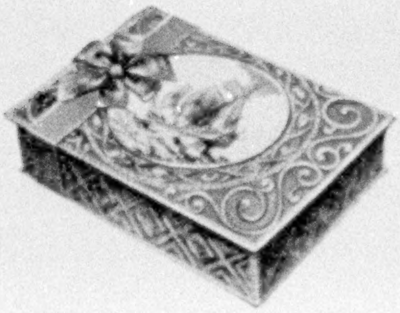
This loved package needs no introduction. Each piece in the Sampler is the favorite of tens of thousands of people. Send a Sampler—and win a smile. In one, two, three and five pounds.

$1.50 the pound

The FLORENTINE

A delightful gift. And useful, too. This art metal box, beautiful in coloring and design with the famous Santa Maria in full sail is sought after for constant use.

$4 the box

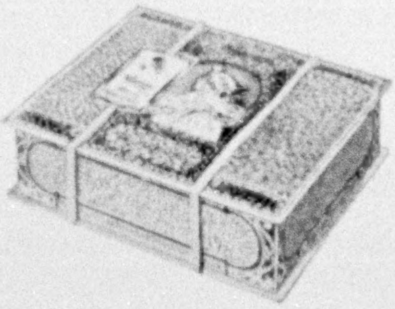


Whitman's
Prestige
Chocolates

The PRESTIGE

The ultimate in candy gifts! Distinctive in design—useful in box—delicious to the eye and taste in contents. Each piece especially designed for the Prestige—daintier in size with infinite hand work and luscious costly centers. In one, two and three pounds.

$2 the pound



The SALMAGUNDI

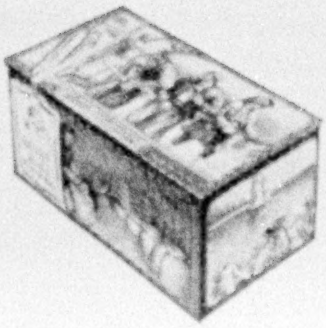
"A medley of good things" in chocolates packed in a charming metal box. And the box finds many feminine uses. In one and two pounds.

$1.50 the pound

The PLEASURE ISLAND

Here is plunder of the most luscious fruits and nuts and varied centers from all over the world enclosed in Whitman's famous chocolates. In one and two pounds.

$1.50 the pound



A Very Merry Christmas

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THE DANUBE, HIGHWAY OF RACES

From the Black Forest to the Black Sea, Europe's Most Important River Has Borne the Traffic of Centuries

By Melville Chater

Author of "The Shores of Sunrise," "Through the Back Doors of France in a Canadian Canoe," "Michigan, Mistress of the Lakes," etc., etc., in the National Geographic Magazine

"YOU'RE too late," announced the quay master of Turnu-Severin. "The Danube boat has gone."

"And when does the next one leave?"

"Not until the ice flows out of the Danube, next spring," he replied.

We sat down on our suitcases to think it over. With the especial purpose of taking that westbound boat, we had come by rail from the Black Sea and up the Danube Valley to Turnu-Severin. There the maritime Danube, with its sprawling delta, its reedy expanses, its marshy plains, has been left far behind.

There the Orient has been exchanged for the Occident—Moslem minarets for Greek-Orthodox domes, old Turkish gates for old Roman bridges. There a narrower Danube winds between blue, ever-lifting hills, the gateway to western Europe.

And there, unless, like us, you arrive out of season, you may board one of the big river steamers that all summer long ascend or descend through half a dozen countries lying between the Black Forest and the Black Sea.

THROUGH THE IRON GATE

"Missed your boat, eh?" said a bronzed man standing near us. "If you like, you can come as far as Orsova in my launch. You might catch something up there."

We thanked him and climbed aboard. He proved to be a Hungarian tug captain who had spent some youthful years barging on the Hudson, and he still retained glamorous memories concerning Western ways of progress along that river.

Hardly was Turnu-Severin astern when we found ourselves amid a wild swirl of waters, before whose terrific force our progress more and more resembled the freak feat of trying to mount a descending escalator. The launch quivered with propeller revolutions, yet remained almost static amid crested wavelets that flew past us, so our acquaintance said, at a speed of twelve feet per second.

At last we gained the shelter of an artificially walled channel, from which we presently emerged in midriver, beyond reach of that devil's caldron. Men call this two-mile stretch the Iron Gate, and doubtless the Argonautic heroes in their ascent gave it some equally forceful name, perhaps likening it to the battering club of Herakles.

For thousands of years the club battered, or, if you prefer, the gates clanged against craft that sneaked upshore, towed

Photograph by Melville Chater

RUMANIA'S OIL AND WHEAT TRAVEL UP THE DANUBE BY TANKER AND BARGE

The mighty river's navigable length is nearly 1,600 miles and it serves seven nations on its course from the Black Forest to the Black Sea.

by battalions of men. At last, owing to the decisions of the Berlin Congress in 1878, the rapids of the lower Danube were regulated by Hungary at a cost of $9,000,000.

"There's Ada Kaleh," remarked our acquaintance, pointing to an islet off Orsova. "Folks call it the Forgotten Island because the Berlin Congress overlooked it. Now, would you catch an island being overlooked in the Hudson? Why, there'd be an amusement park on it!"

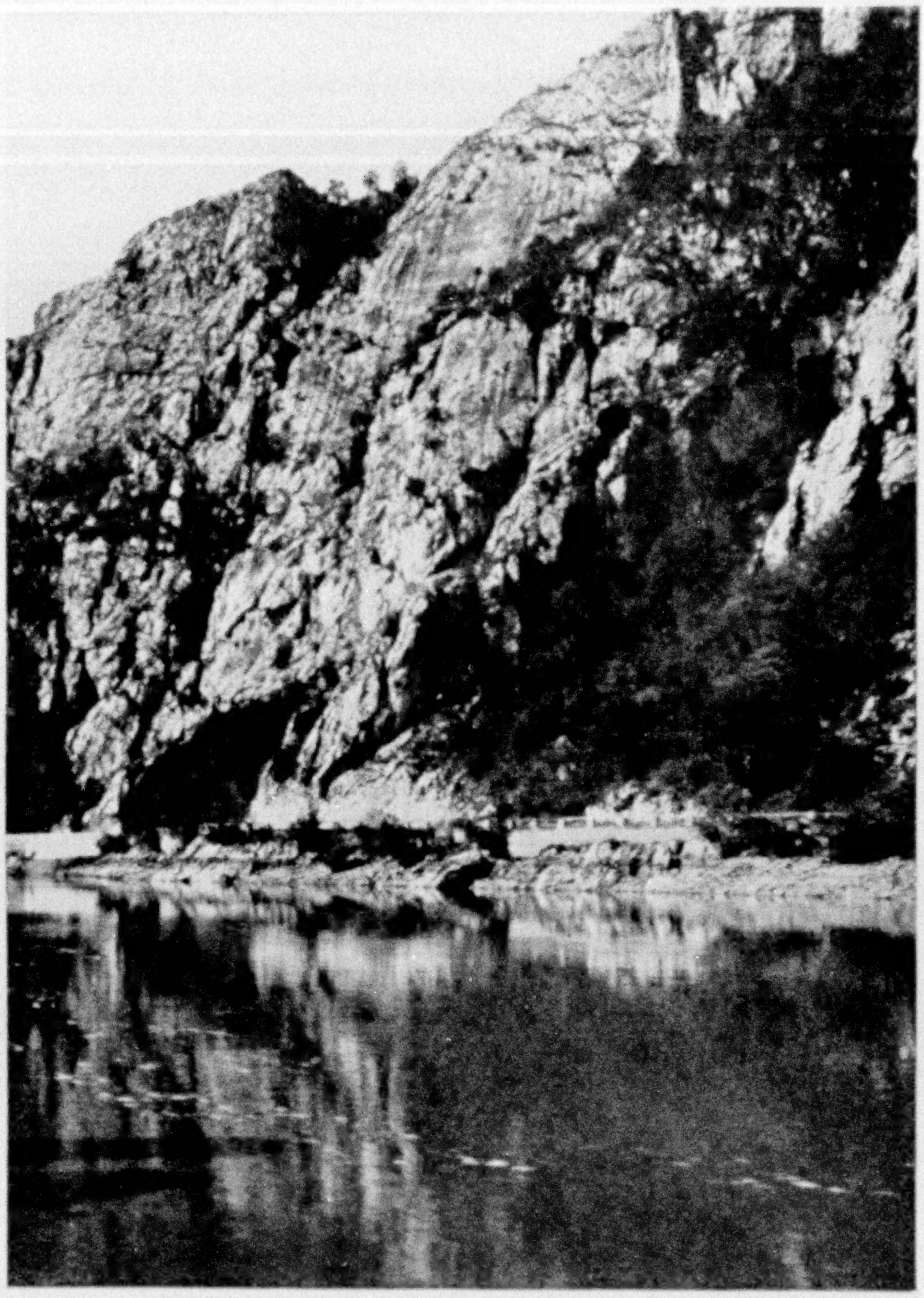
We went ashore for a glimpse of the quaint island colony of Bosnian Moslems, who long ago built their little houses amid the encompassing ramifications of a dismantled Turkish fortress. It was as peaceful a sight as that of wild flowers carpeting an old shell crater.

Situated between political frontiers and with periodic wars hurtling up and down the Danube, these simple islanders have continued since old Turkish times to cultivate their tobacco and attar-producing roses.

"There's a European war on," they were told during Napoleonic times. And, "Well, it's sure a fine day for it!" replied the old fellows, and went right on with their gardening. That the ensuing Berlin Conference overlooked the existence of Ada Kaleh, and hence apportioned it to no one, probably elicited little local comment beyond "*Inshallah!* As God wills it! But let's get on with our gardening." What though it has since been annexed by one Balkan State and ceded to another? What though the world rings with schemes for suppressing war? Peace or war, little Ada Kaleh keeps right on attar-making, with her serene philosophy of "I cultivate my garden."

A "SCRAMBLED" RIVER

By the time we had landed on Orsova's tree-bordered quay we had talked our good-natured tug captain into taking us with him up the Danube. The business of payment was settled over a glass of Tokay; then we moved our traps aboard, into a cosy deck cabin of the *Patria,* a 400-ton tug, destined for Regensburg, with tank barges of Rumanian oil.



Photograph by Melville Chater

TRAJAN LED ROME'S LEGIONS THROUGH THE KAZAN PASS

Here, shut in by almost perpendicular cliffs, the Danube narrows to less than 200 yards and is very deep. Near the base of the magnificent rock masses, just beyond reach of high water, there are still signs of the military roadway built by the Romans (see text, page 647).

"Only," the captain warned us, "to travel on a tug you must get permission from the river police. You see, the Danube is no free-and-easy Hudson. There's customs duties and enough local port regulations to make a sailorman go bald with worry. No, the Danube's more like a political conflict, with seven tickets in the field, which is to say, it flows through three kingdoms, one regency, two republics, and a social democracy."

He spread out a big chart. It showed the river's entire length to be 1,800 miles—a length that is more than double that of the Rhine and is only exceeded in Europe by that of the Volga. Its navigable portion, as shown on the chart, totaled nearly 1,600 miles; and a glance at its nine political sectors, of which three are joint—that is, shared by pairs of countries—revealed that almost one-third of the Danube's navigable length is thus shared by States which face each other from the river's opposite banks.*

Truly, a "scrambled" river! We appreciated that its police would have no such sinecure as that enjoyed by the proverbial "traffic cop in Venice." Likewise we comprehended why it has been internationalized. That step was inaugurated in 1856, and was furthered in 1921 by statutes guaranteeing freedom of navigation for all flags concerned—a pact which is safeguarded by the International Danube Commission.

The river police proved obliging in our case. With a long tow astern, the *Patria* headed upstream. Presently we entered a sheer-faced gorge of sky-cutting profiles that inclosed us in an endless vista of rock-walled waters.

Silent as twilight, primitive as when the dædal Danube wrought this passage to the sea, the Kazan Defile might easily have seemed to the early Greeks a Charon-haunted Styx leading to the underworld. Their bards called the future Danube the

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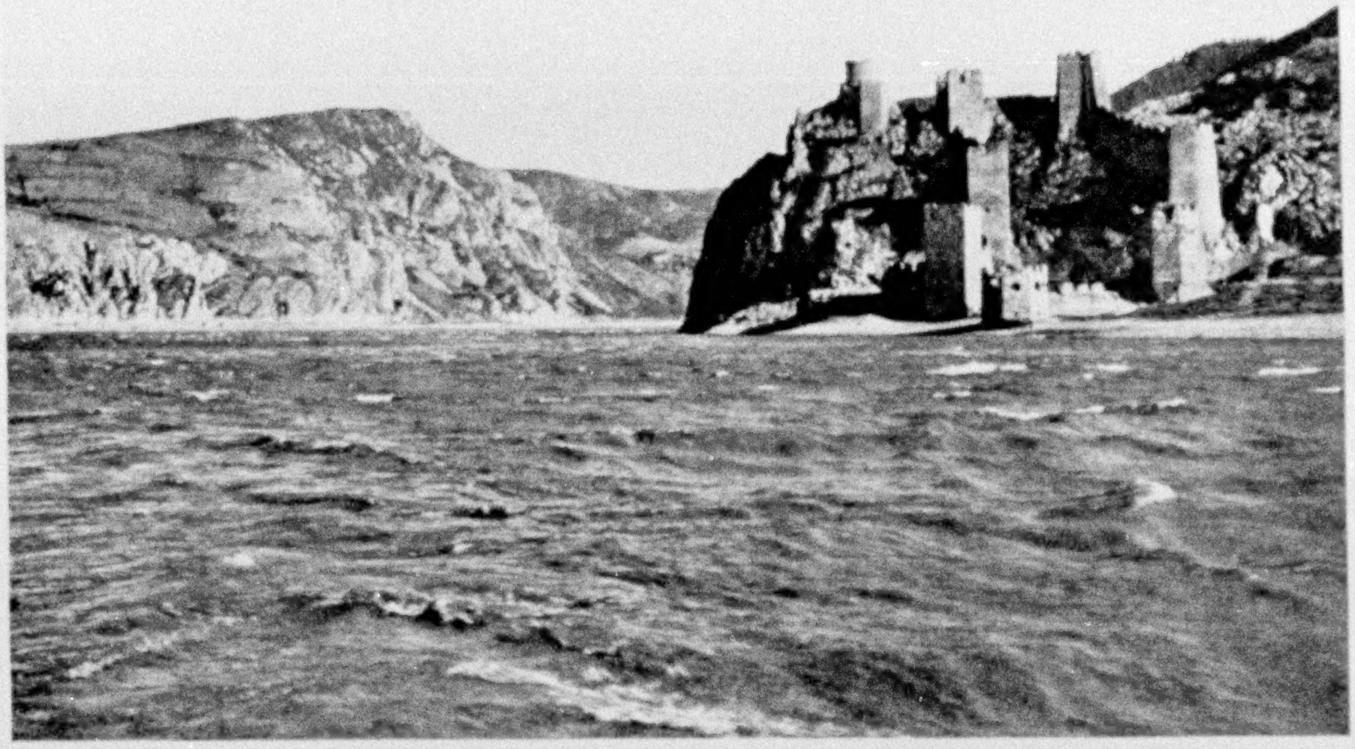
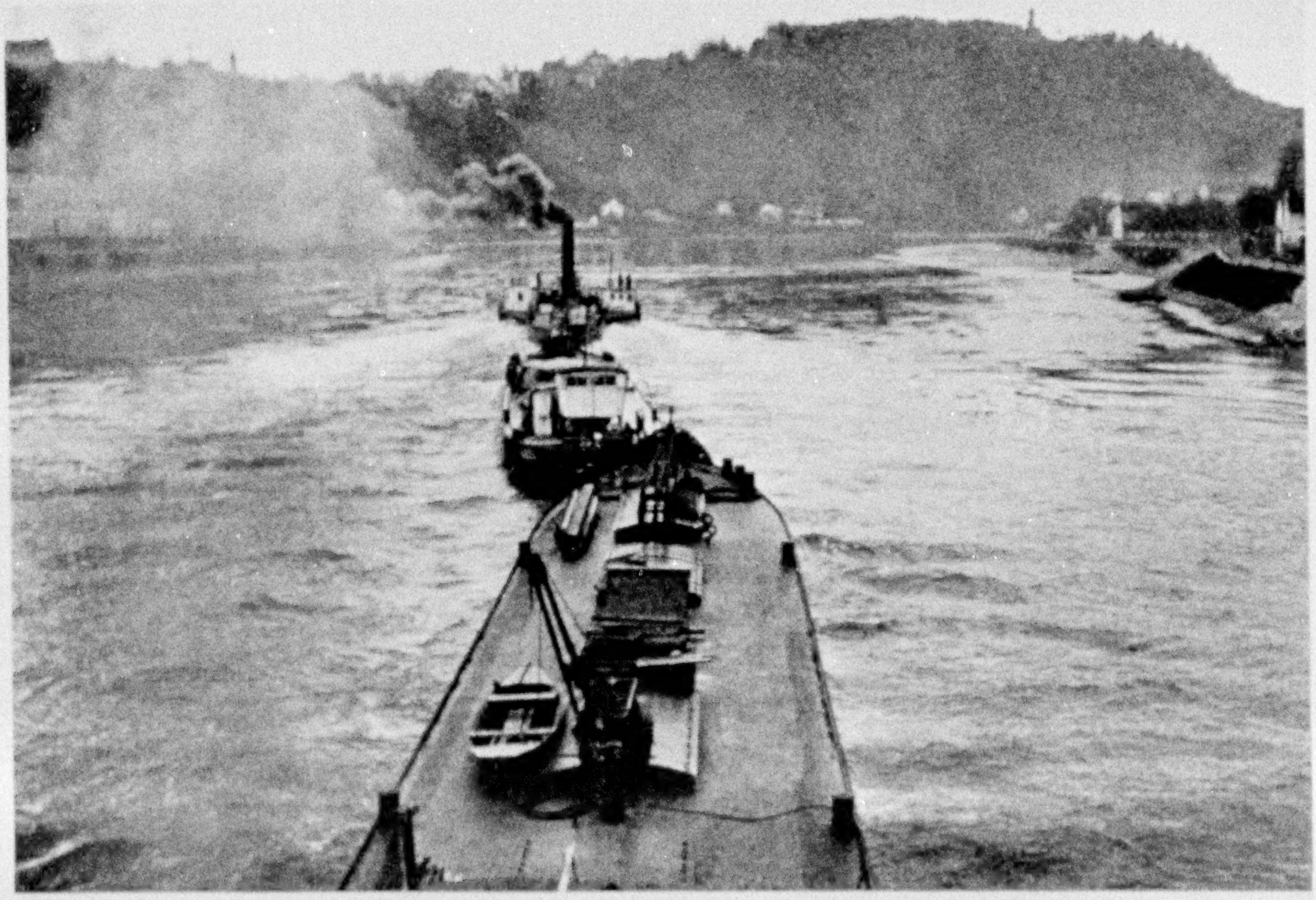
* See the Map of Europe and the Near East, special supplement with this number of the NATIONAL GEOGRAPHIC MAGAZINE.



THE BROKEN MASSES OF GOLUBACZ CASTLE RISE ABOVE A NARROWING DANUBE

At this point in Jugoslavia, a short distance above the Kazan Defile, mountains bear down upon the river from both sides and force it to rush madly between towering walls of rock. The spot is a key to the lower Danube and has been the site of a fortress for many centuries.



Photographs by Melville Chater

A DANUBE TUG TOWS ITS STRING OF FREIGHT-LADEN BARGES

Rising in southern Germany and flowing through six other countries before merging its waters with those of the Black Sea on the Rumanian coast, this mighty river is the most important commercial waterway of central and southeastern Europe.

Photograph by Melville Chater

THE AUTHOR TRAVELED ON THIS TWO-STACKED TUG

Under a provision of the Treaty of Versailles, the Danube was internationalized and boats of all nations may navigate its waters (see text, page 645).

Istros and dwelt in awesome terms on its "shadow-environed origin," thus placing its source at the head of the Kazan, where rapids still swirl malevolently over ledges of rock. Ancient navigation and imagination could no further go.

But the Greeks never permitted superstition to interfere with business. With sword in one hand and merchandise scales in the other, they unloaded textiles, pottery, and arms on the aborigines in exchange for furs, hemp, and slaves.

Later on, Herodotus visited what he termed "the mightiest of rivers." With singular approximation to the facts, he described the Ister as bisecting Europe, and he added a sort of Chamber of Commerce report on honey resources in a Danubian region whose vast bee armies rendered it uninhabitable.

TRAJAN CARRIED ROMAN EAGLES THROUGH THE KAZAN DEFILE

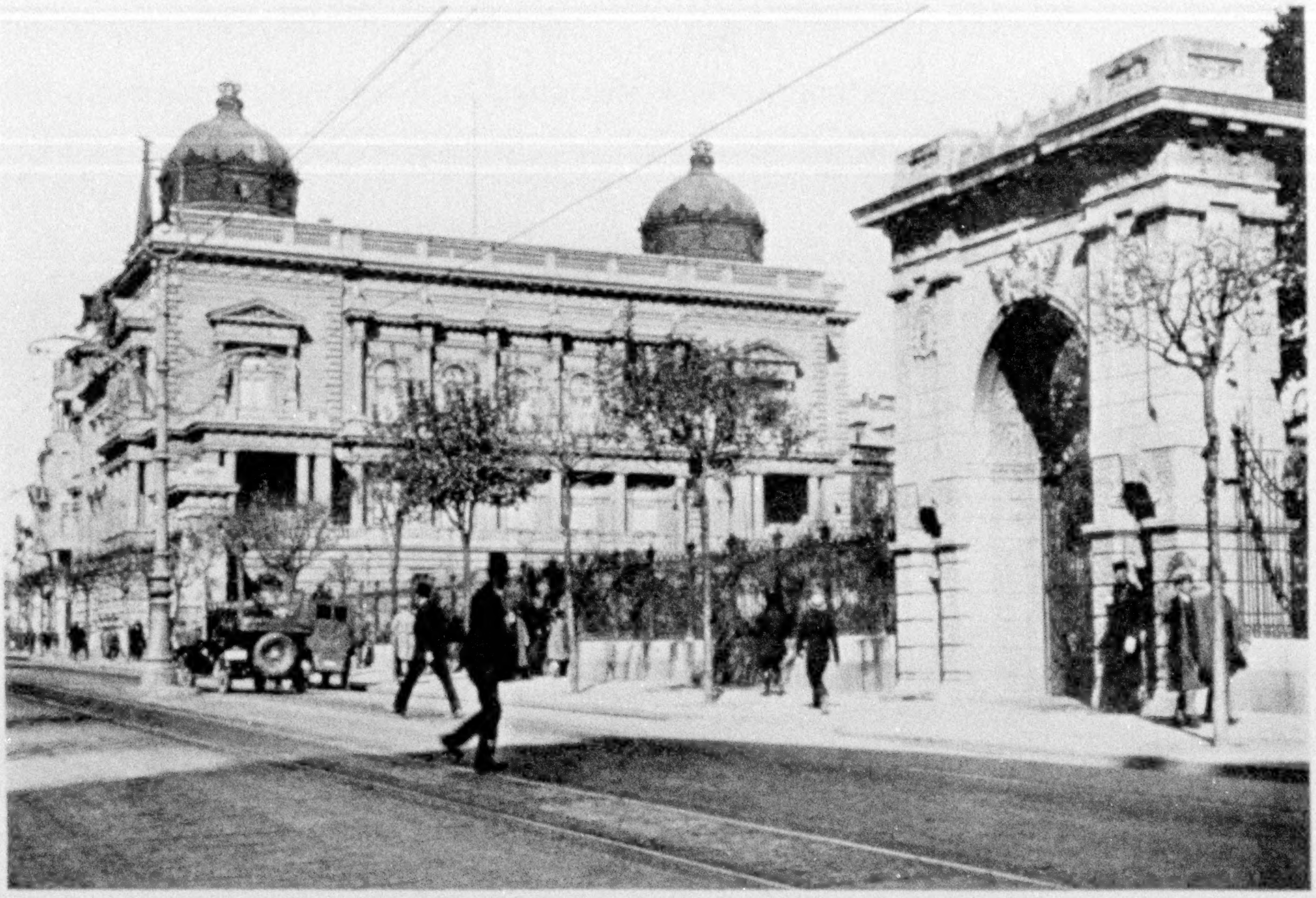
We were fairly steeping ourselves in the romantic qualities of that impassable defile—impassable for anything but boats until very recent times—when, on the side opposite the modern, cliff-skirting road, we beheld a repellent sight. Somebody or other had scratched his name in capital letters on the sheer cliff-face. Now, we had previously encountered scratchings by "Otto Schwartz, Berlin," on the Pyramids, and by "W. Brown, N. Y.," on a spire of Milan Cathedral, but we hadn't anticipated the presence of their tribe in the Kazan Defile.

"What's the ruffian's name?" I muttered. "Looks as if it began with 'Imp—.'"

"I make out 'Max,'" said my friend.

We borrowed the captain's marine glasses. Of that bleared inscription we could discern only "IMP. CAESAR . . . TRAIANUS AVG. GERM. PONT. MAXIMUS." But that was more than enough. And we agreed that Trajan, or any other Roman who could lead an army along the flat face of those river-washed cliffs by means of beam-supported galleries, had a perfect right to cut his name there!

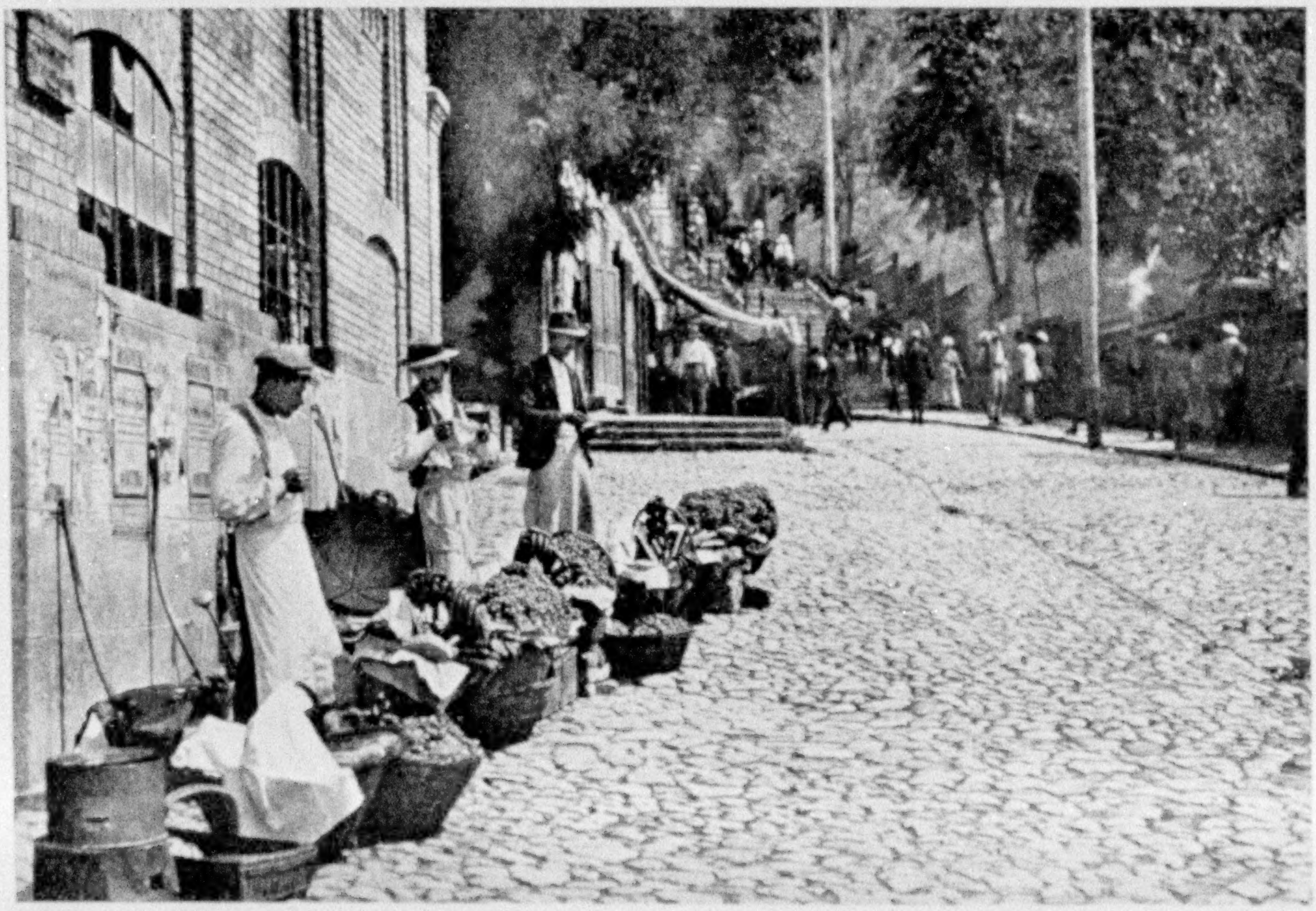
For five centuries the Roman eagles ruled over the entire Danube—a unifying achievement that has not been repeated in two thousand years. "Father Danubius,"



Photograph by Melville Chater

SINCE THE WAR, BELGRADE HAS EXPERIENCED A BUILDING RENAISSANCE

The Royal Palace is only one of many impressive structures built or planned for the beautification of the Jugoslav capital. An ambitious scheme is also under way for the development of an extensive park system, and no effort is being spared to rejuvenate this historic Balkan city.



Photograph by Maynard Owen Williams

OVERHEAD EXPENSE DOESN'T WORRY THESE FRUIT SELLERS

They display their wares in the street and pray for good weather. The thoroughfares of Belgrade are mostly cobbles or wooden blocks, but asphalt and stone paving is one of the first changes contemplated under the new and comprehensive city improvement plan.

a bearded river god, appeared on Roman coins. The river was divided into strategic sectors, each with its separate fleet. Of some eighty far-flung fortifications, little remains to-day except, near Regensburg, traces of the Germanic Limes, a Danube-paralleling wall raised by Rome against northern invaders.

"Trade follows the flag." Castra Regina (Regensburg), Castra Batava (Passau), and other Roman camps developed into traffic centers for grain and military stores. The Danube's second period of commerce had begun.

For two days and nights the *Patria* churned ahead between wide plains, and on the third afternoon we sighted Belgrade (Beograd). Perched high over the confluence of the Danube and the Sava, the Jugoslav capital presents a striking picture. Few European cities are situated on two such waterways, whose navigable lengths within Jugoslavia total 720 miles.

Photograph by Ewing Galloway

MISS SERBIA GOES FOR A RIDE

Instead of pushing her offspring along in a perambulator, the Serbian mother not infrequently carries the little one in a comfortable basket strapped to her back.

BELGRADE BECOMES AN OCCIDENTAL CAPITAL

One's first glimpse of Belgrade's quays, with their gaily bedizened soft-drink sellers and sweetmeat peddlers, misleads one to expect a city reflecting the colorful East. On the other hand, nothing could be more definitely, if nascently, modern than Belgrade's central plexus, where tall buildings loom over wide thoroughfares that lead through shopping, or banking, or hotel quarters.

It is only some occasional glimpse of gaily dressed peasants, or of gun-toting Montenegrins — booted, pillbox-capped, ablaze with crimson and gold—that reminds you that you are still in southeastern Europe, where costumes have not yet been entirely discarded for mere clothes.

One doesn't grasp how recent is Belgrade's occidentalization until, skirting the river-dominating Kalemegdan Park, he gains the ancient fortress at its tip; for the Turks quitted that fortress only 60-odd years ago. Serbia has been free of oriental leading strings for only half a century. And the sight of the confluence of those twin rivers, where occurred some of the

Photograph by Melville Chater

ONIONS ARE AMONG THE STRONGEST ISSUES ON THE CURB MARKET AT BELGRADE

The pungent bulbs are widely used in Jugoslavia in the preparation of *lomac*, a Balkan version of Irish stew. Most of the vegetable marketing is conducted on the street (see, also, p. 648).

most critical actions on the Serbian front during the World War, serves to remind one that it was only with the Armistice that Belgrade became the capital of a Southern Slav State which, culturally speaking, faces westward.

UNDER FIVE FLAGS ON THE DANUBE

We left Belgrade with our burden enlarged to 16 enormously long barges. They flew four different flags, while the *Patria* flew a fifth—an instance of how international a Danube tow may be. For a while vineyard-clad hills enlivened the scene, but beyond the Drava's mouth lay 150 miles of treeless, monotonous landscape, the fringes of the great Hungarian plain.

"It's rather tame here," I volunteered to the skipper. He was hopping to and fro on the bridge like a pea on a hot griddle. "Tame?" he ejaculated. "Well, what with considerably less than seven feet of water hereabouts and a lot of shifting shoals in the channel, I don't exactly have to play patience in order to keep awake. Take a look at my chart."

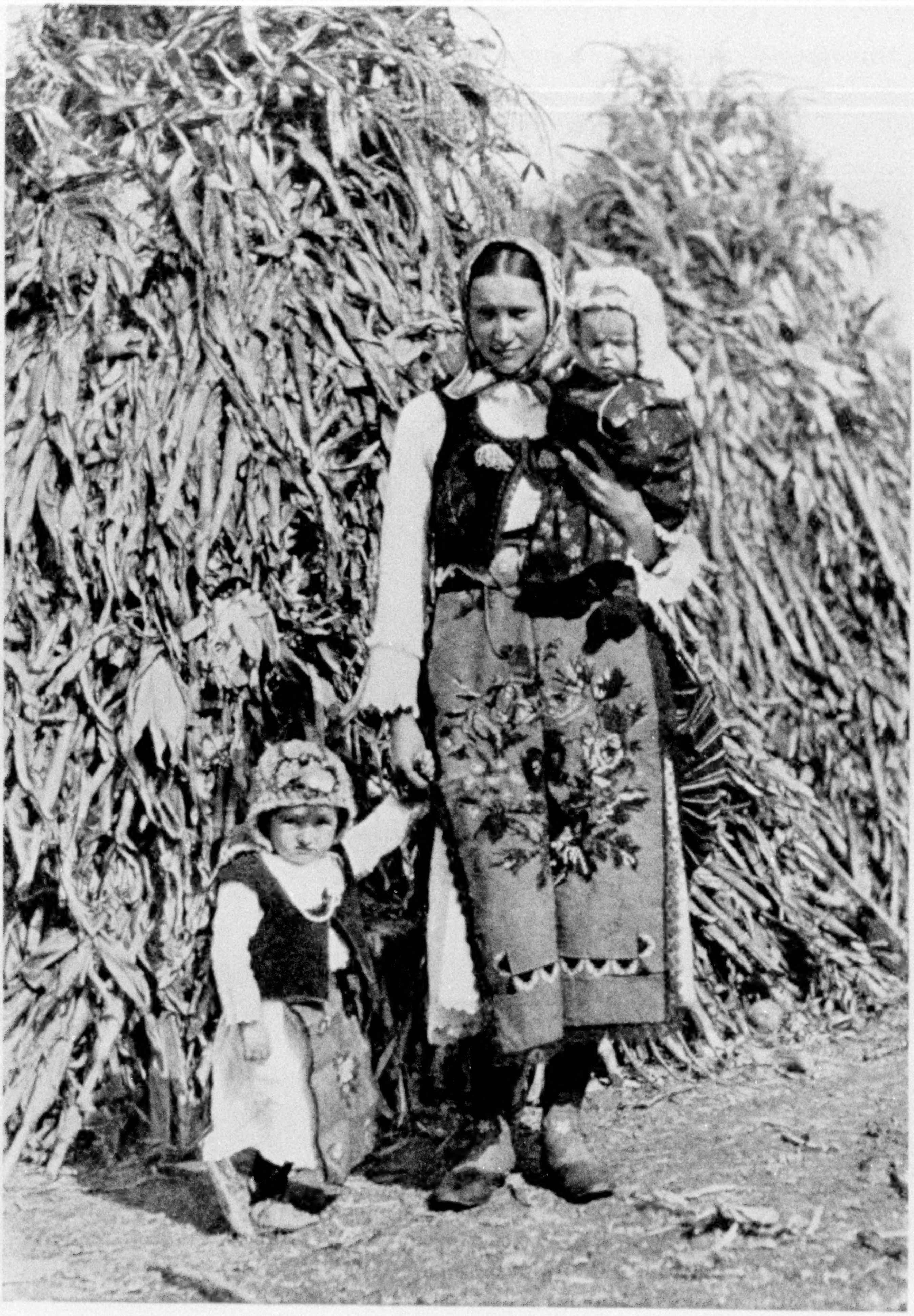
The chart revealed the local section of the Danube as flowing among a plexus of secondary branches that, as delineated, resembled a basketful of snakes. And then we understood why the river's surface was cut by longitudinal and lateral dikes and why levees lifted along its flat banks.

The Danube's depth is proverbially variable. What with its 16 main tributaries and hosts of lesser ones, "high water" at given points on the river may vary by 30 feet, while at "low water" even its maritime section is not navigable for boats drawing more than six feet.

Budapest peered up around a curve. We went ashore without a word of Hungarian at our command, and the first thing we encountered was a shop with an arresting sign. It ran:

POLGARILAKASBERENDEZES-VALLATAT

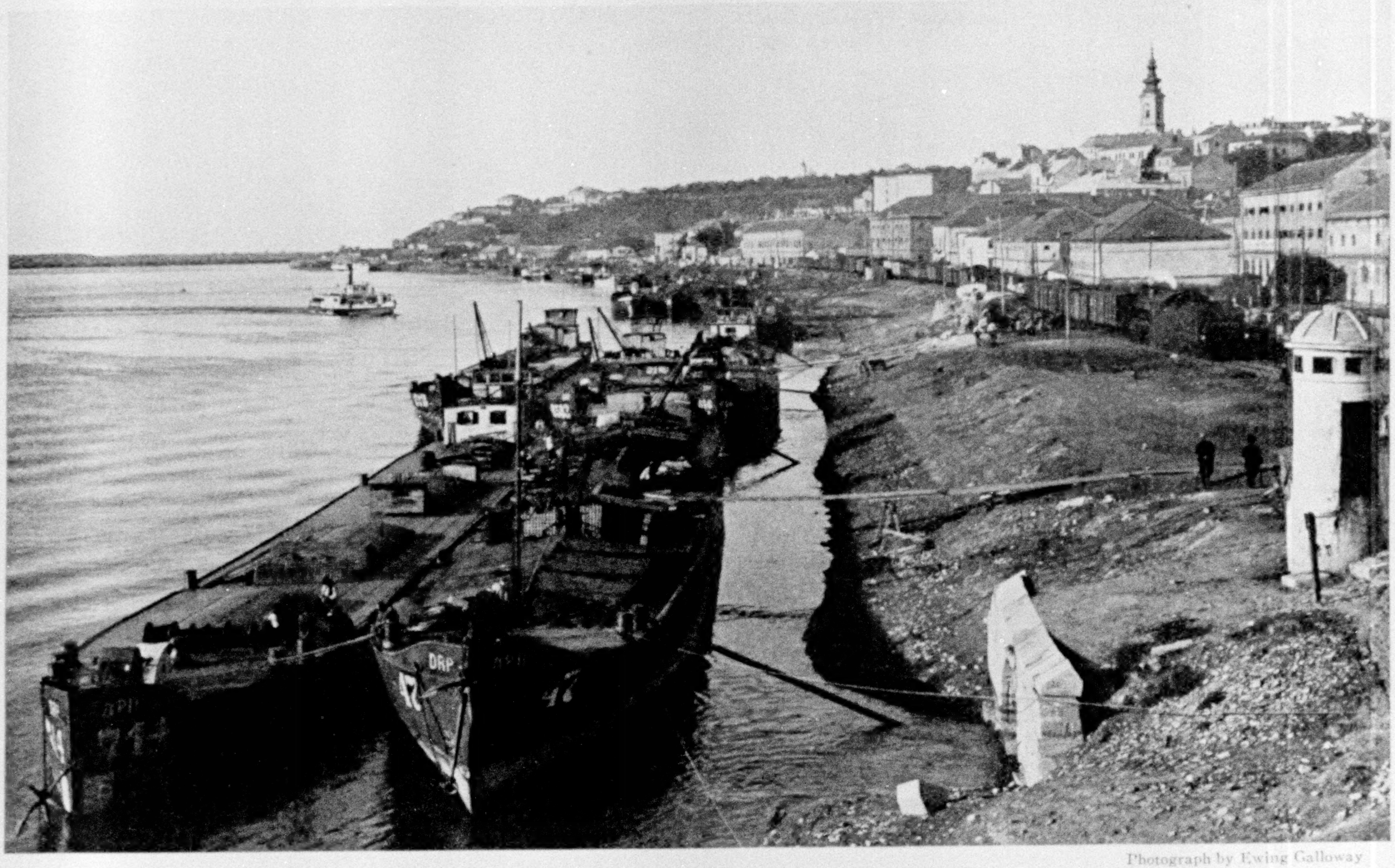
We stood in hushed awe before that sign. It was hypnotic; it had the allure



Photograph by Ewing Galloway

FEMININE LOVE OF ADORNMENT EXTENDS TO WORKERS IN THE FIELDS

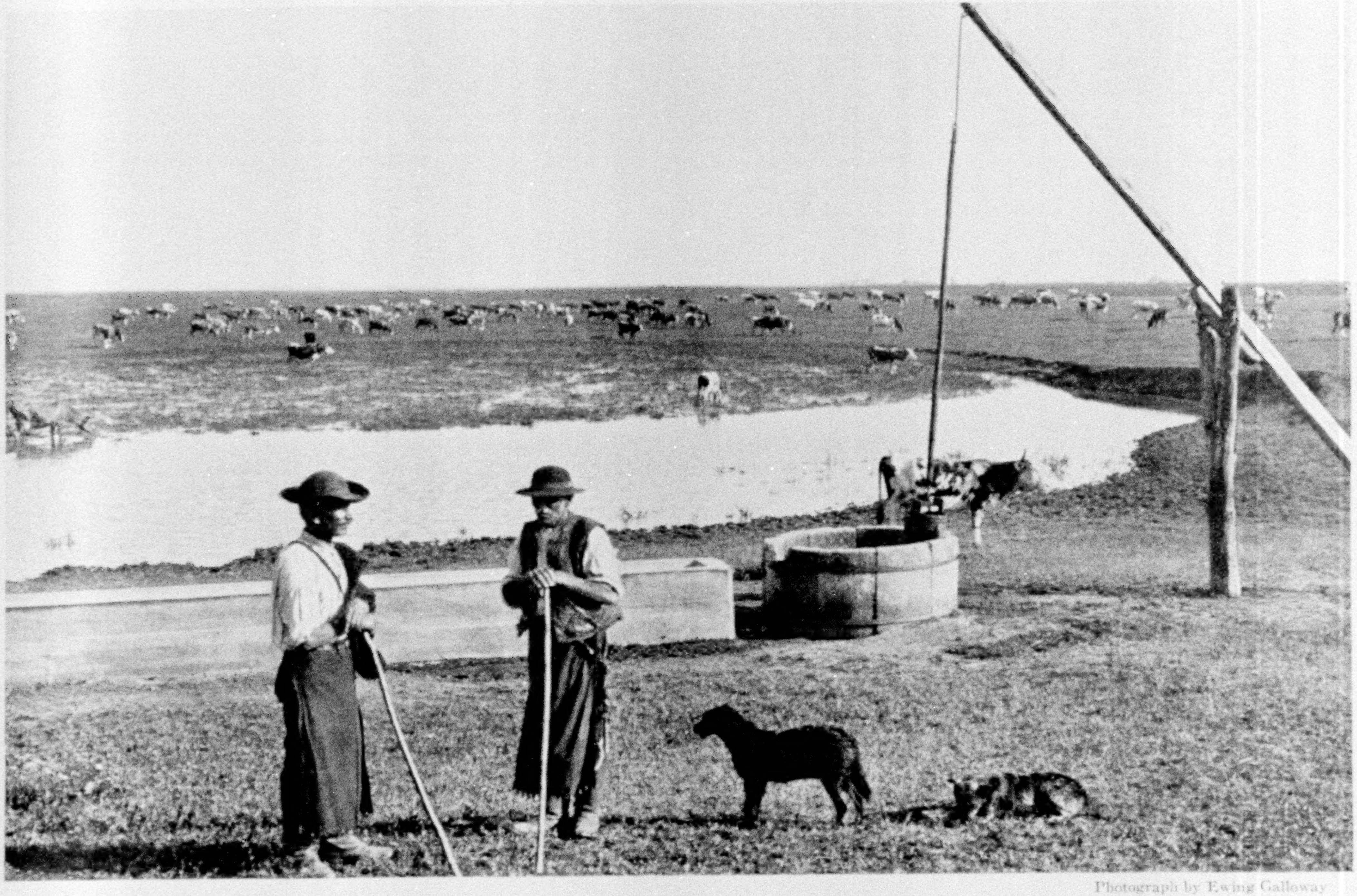
As hers is primarily an agricultural country, the Serbian woman, who occupies a place of honor and respect in the social structure, works alongside her husband and brothers in the fields. In common with nearly all her Balkan sisters, she is an adept at the art of embroidery.



Photograph by Ewing Galloway

CHEAP RIVER TRANSPORTATION PLAYS A LARGE PART IN THE BUSINESS LIFE OF THE JUGOSLAV CAPITAL

Belgrade lies at the confluence of the Danube and the Sava and about midway between Constantinople and Paris. It is an enterprising industrial city and a shipping center of importance. The cargoes of these boats are grain and other bulk freight.



Photograph by Ewing Galloway

COWBOYS AT A WELL ON THE PLAINS OF HUNGARY

The land of the Magyars is particularly adapted to stock raising and the Government is doing all in its power to improve the quality of the animals, particularly milch cows.

© Hungarian Press-Photographic Exchange

HUNGARIAN PEASANTS ARE GREAT BREAD EATERS

These Gargantuan loaves weigh more than 10 pounds apiece, and a grown man will sometimes consume three of them in a week.

Certainly, whatever difficulty Hungarian presents to the outsider, it is offset by those agreeable and cosmopolitan Budapesters, who seem able to address every foreigner in his own tongue.

BUDAPEST, ONE OF EUROPE'S LOVELIEST CITIES

Not to know Budapest is to have missed one of the loveliest of European cities. It has its own distinctive stateliness that reflects the cultural flowering of a race whose kingdom has been enthroned on the Danube for a thousand years. As certain American metropolitan quarters, such as "Little Italy" or "Little Germany," reflect their mother countries in miniature, so Budapest's topography reflects on a small scale the lineaments of what, as a result of the war, is literally "Little Hungary." Ancient Buda, on the Danube's right bank, rears aloft on rocky crests that represent the foothills of Hungary's mountains, while on the other bank modern Pest stretches away in levels that prelude Hungary's plains.

Buda, with its splendid palace, symbolizes Hungary's long succession of rulers, reaching from Stephen the Saint, of 1000 A. D., down to the latter-day reigns of Maria Theresa and Franz Josef. Pest's parliament houses, memorable in their river-set majesty, symbolize the early won liberties of a people whose forefathers' rights were established almost contempora-

of a skillful window-dressing. Of an English-speaking clerk, who stood in the doorway, we inquired what the word meant. Glancing down its superb vista of letters, he thus translated:

"For-those-people-of-the-middle-class-flat-furnishing-establishment."

"In other words," we queried, "furniture store?"

"Why, yes," he replied, "if you want to put it that way." He explained that Hungarian is an agglutinative language that permits you to combine half a dozen words in one, and we reflected how economic it would be if you could get past with that sort of thing on an American telegraph blank.

neously with England's winning of Magna Charta.

Above all, Budapest is a city of beautiful vistas. One's admiration is divided between its stately public buildings and the carefully apportioned squares, parks, and boulevards that lend to the picture an architectural airiness, a spaciousness undefaced by an industrialism whose chimneys loom in adjacent suburbs.

Few cities over the million mark, with as many as 72,000 factory workers, can boast, like Budapest, of an unindustrialized aspect, of an island pleasance lying in midriver at its doors, of delightful riverside promenades, where one lounges or lunches and where motor cars are strictly tabu. And in all this one senses an old civilization which, in the face of postwar changes, still clings to the graces of life.

Certain of those changes reveal with what ingenuity Hungary has met her reconstruction problem. "How many crowns for a dollar?" we asked a Budapest foreign-exchange clerk; and he replied, "I'll give you the rate in pengös." Pengös? We were familiar with most European currencies and we had a literary acquaintance with doubloons, ducats, and moidores; but what, in the name of coins ancient and modern, was a pengö?

The answer, as suggested by the word's tinkling sound, is "Money that rings like gold." When postwar Hungary's currency crashed, the phrase "Hungarian krone" (crown) became a synonym of worthlessness, and so, along with her financial reconstruction under the auspices of the League of Nations, a national coin-naming competition was inaugurated. As a result, the discredited "krone" was replaced by the onomatopœic "pengö," to reinforce faith in the stabilized currency.

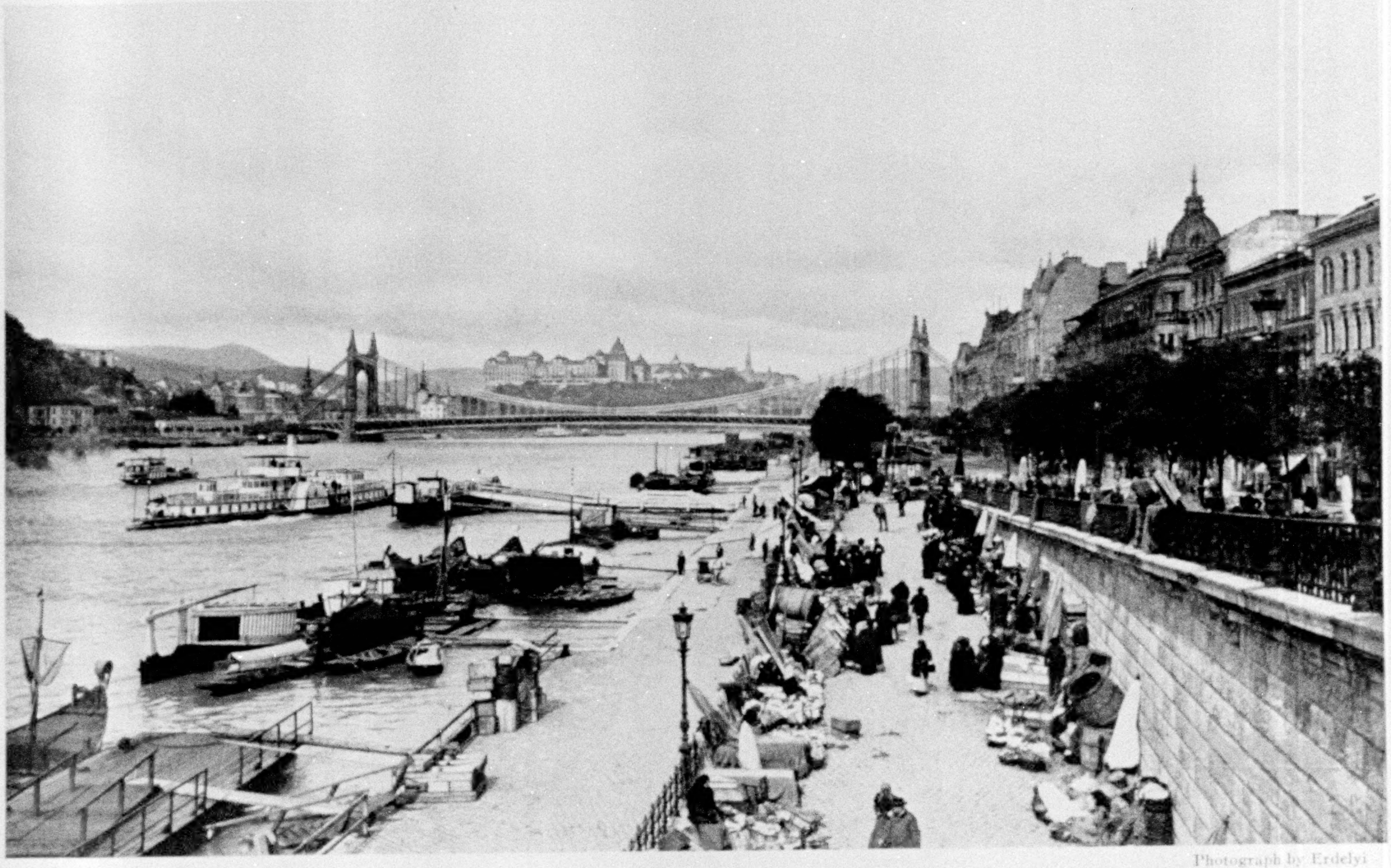
Photograph from Willard Price

A SUCKLING PIG TAKES THE PLACE OF CHRISTMAS TURKEY IN THE BALKANS

The Serbian oak forests provide excellent pasture for pigs, and the peasants raise them in large numbers at small cost. Hundreds of thousands of pigs are exported annually by Jugoslavia.

THE EYE IS ASSAILED WITH COLOR ON THE HUNGARIAN PLAIN

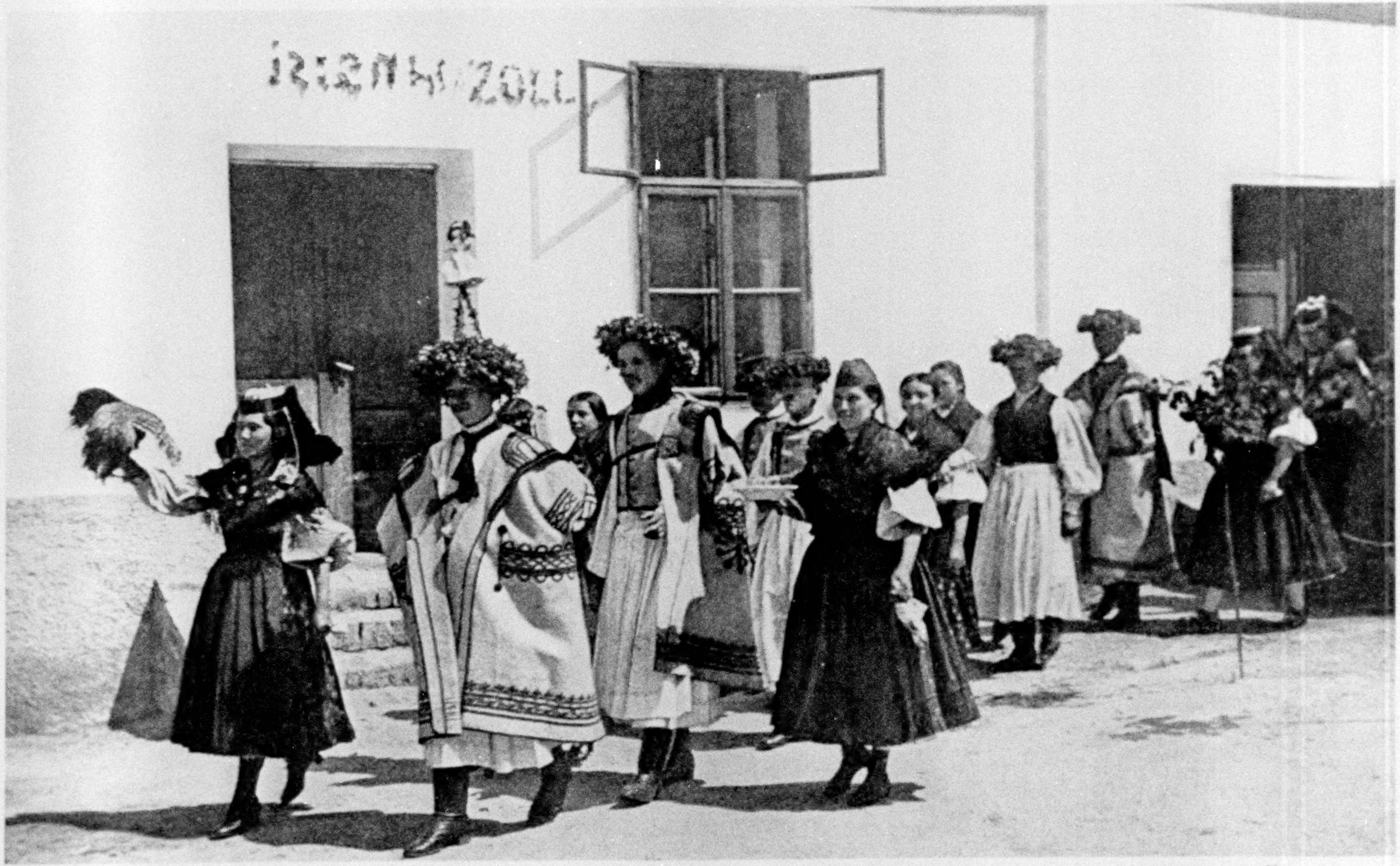
Shortly after our arrival at Budapest we discovered that, contrary to our first impressions, the Hungarian plain is far from being either monotonous or lacking



Photograph by Erdelyi

SIX GREAT BRIDGES SPAN THE DANUBE BETWEEN THE HILLS OF BUDA AND THE PLAINS OF PEST

The handsome Elizabeth Bridge (in the middle distance) has a suspension span of nearly 1,000 feet. The impressive pile of the Royal Palace rises from the heights of Buda in the distance, across the river (see, also, illustration, page 658). In the foreground is a Pest riverside street market.



Photograph by Kerny Istvan

THERE ARE NEARLY AS MANY WAYS OF CELEBRATING A WEDDING IN HUNGARY AS THERE ARE VILLAGES IN WHICH TO WED

The peasants are a hard-working people and they make much of such opportunities for gaiety as come into their lives. The wedding festivities last from two to three days among the poorer classes and a week or more among the rich. Indeed, legend tells of one celebration which lasted a full year. These revelers are from southern Hungary (see, also, text, page 658).

Photograph by Melville Chater

MARIA THERESA'S MAGNIFICENT RESIDENCE AT BUDAPEST

For a thousand feet the façade of the palace extends along an eminence overlooking the Danube. A beautiful terraced garden descends steeply to the river.

in color. You needn't travel for more than a few hours east of the capital in order to see all the colors of the rainbow, or gypsy camps, or a Wild West round-up, or a first-rate Fata Morgana, with illusive seas and cities rising across the plain.

The colors assailed our eyes at the village of Mezökövesd one Sunday morning, in a church square seething with folk. Their black garments merely served as background for superimposed stripes, aprons, bodices, woven in mixed patterns of orange, green, yellow, and purple.

A fringed apron, kaleidoscopic in effect, hung from the waist of each maiden or youth. The former's full-pleated skirt swayed rhythmically as she walked. The latter, in his short, velvet-collared jacket, his tall, flat-brimmed derby, and that indescribably coquettish apron, would have inspired any Fraternal Order of the So-and-sos with hints for a striking lodge costume.

Matrons wearing the cornucopia-shaped coif of medieval association displayed garments of lesser color areas, while dear old grannies promenaded in solemn black—mere background for youth's peacock pageant.

People began to assemble inside the church. Down the village street came a costumed wedding party. In naïve symbolism of hoped-for fertility, the bride bore a chicken, while the bridegroom displayed a baby doll in his hat; and after the event was over the peacock maidens paraded up and down in pairs for the especial benefit of the peacock youths, while we drably clothed onlookers discussed the connection between colorful clothes and early marriage.

The Wild West round-up may be witnessed around Debreczen, whose neighboring plains contain 60,000 head of live stock.* The spectacle of stalwart *csikós* (cowboys) throwing the lasso while wearing derby hats and petticoats lends itself to mirth until one discovers that for dex-

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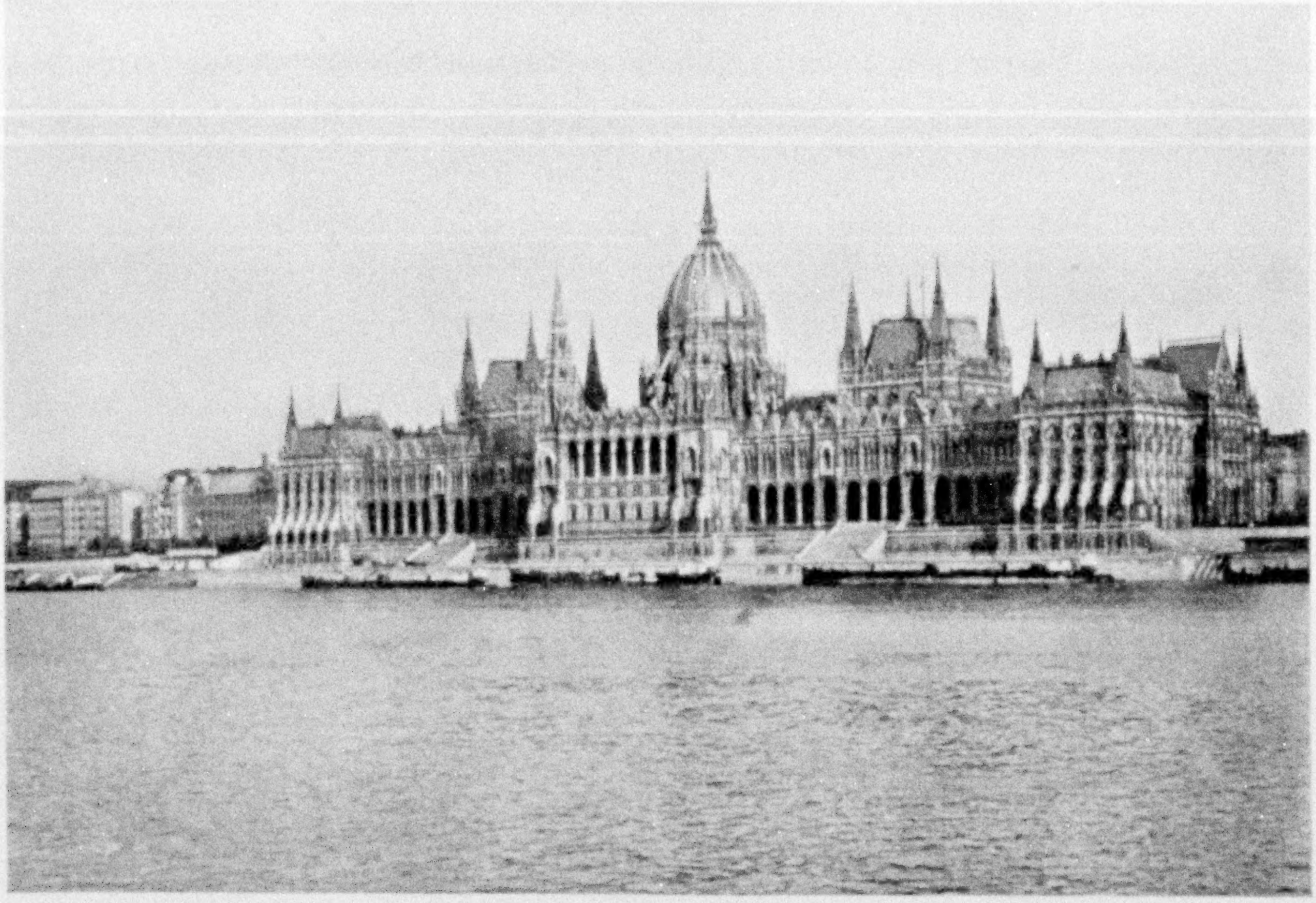
* See, also, "Hungary, a Land of Shepherd Kings," by C. Townley-Fullam, in the NATIONAL GEOGRAPHIC MAGAZINE for October, 1914.



Photograph by Melville Chater

LIKE A FAIRY PALACE, HUNGARY'S PARLIAMENT HOUSES RISE BESIDE THE RIVER

Despite the fact that it covers an area of four and one-third acres, this noble late-Gothic structure at Budapest creates an impression of lightness and delicacy. It was completed in 1902 and is numbered among the world's finest legislative palaces.

terity with rope and horse they have few equals (see illustration, page 660). The big round-ups coincide with Debreczen's fairs, where masses of horses, longhorned cattle, and gaily clad csikós form a spectacle that could hardly have been equaled by our West at its wildest.

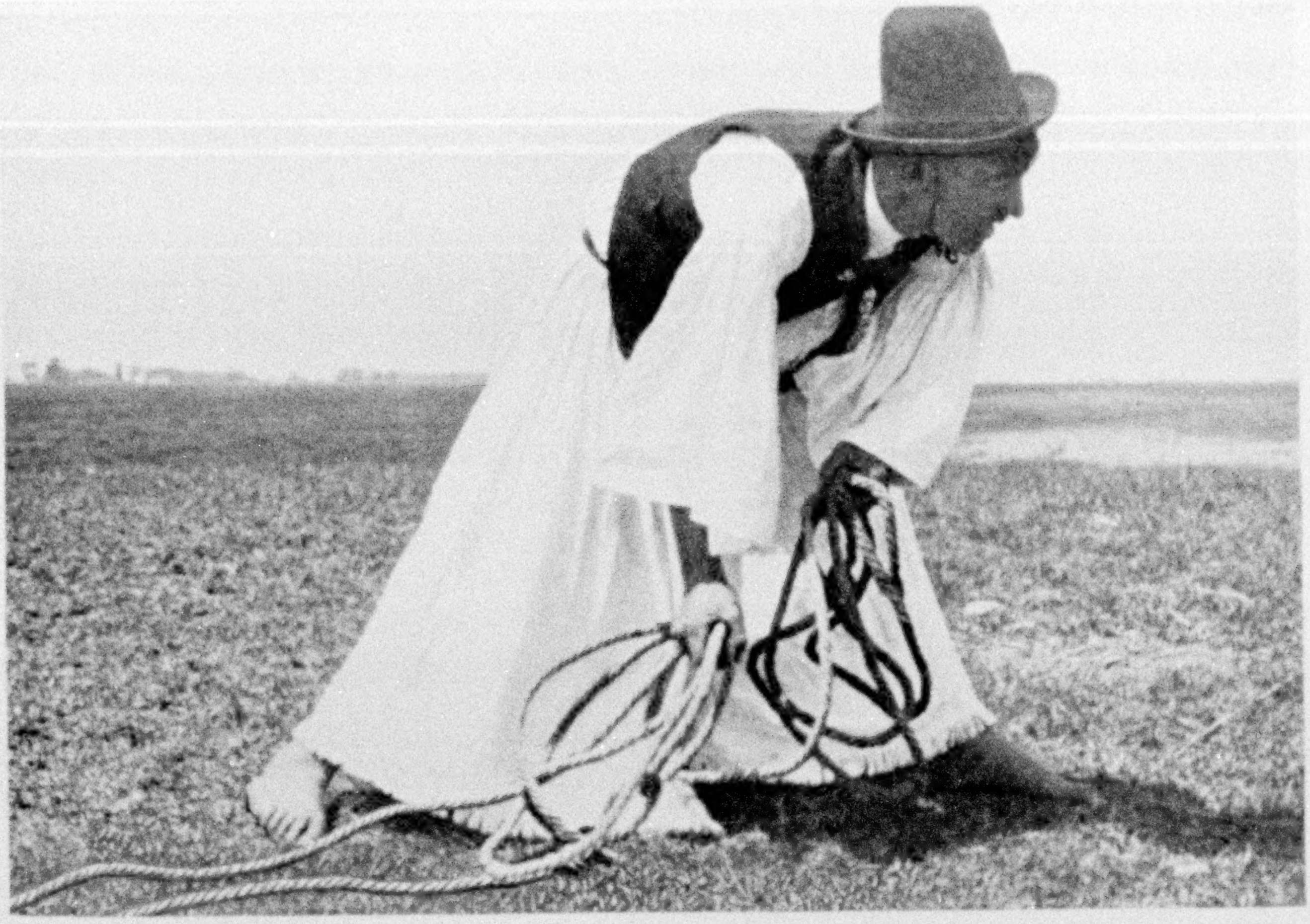
From the northward-rising Tokaj-Hegyalja Mountains, whence comes the sweet and heady Tokay wine, and to southward, along the Tisza's entire course, stretches the larger Alföld, or Great Hungarian Plain, separated from the smaller Alföld by two mountain ranges. Inundation is its ancient enemy. Government engineers assert that the fall of a single dike on the Tisza would put one-sixth of Hungary under water.

The Alföld's grassy expanses, where sky meets circling horizon like a blue, inverted bowl, has the poetry of timeless calm. At times its distant clouds seem so low, so solid, that you almost fancy a cowboy could lasso one and haul it to earth. Daylong nothing is heard but sheep bells atinkle or the lulling pastoral of some shepherd's flute.

A PROMISED LAND TO THE HUNS

What a promised land must have spread itself before the slant-eyed Huns when, in the 4th century, they appeared on those illimitable pastures! These terrible little men—long-armed and flat-faced, clad and capped in skins—were steppe-dwellers, children of the wind and sand. As mobile as those elements, they and their vast encampments of covered wagons and herds, ever trekking from the grass-submerging sandstorm's approach, became ever more like it—a yellow deluge, swift and unforeseen, sweeping over the grasslands of Europe.

For Rome was failing; the Danube's gates stood wide. Five centuries of barbaric invasions obliterated civilization's works along its course. Its banks were held by Franks, Goths, and Gepidæ; by Thuringians, Alemanni, and Avars — a confrontation of tribes north and south,



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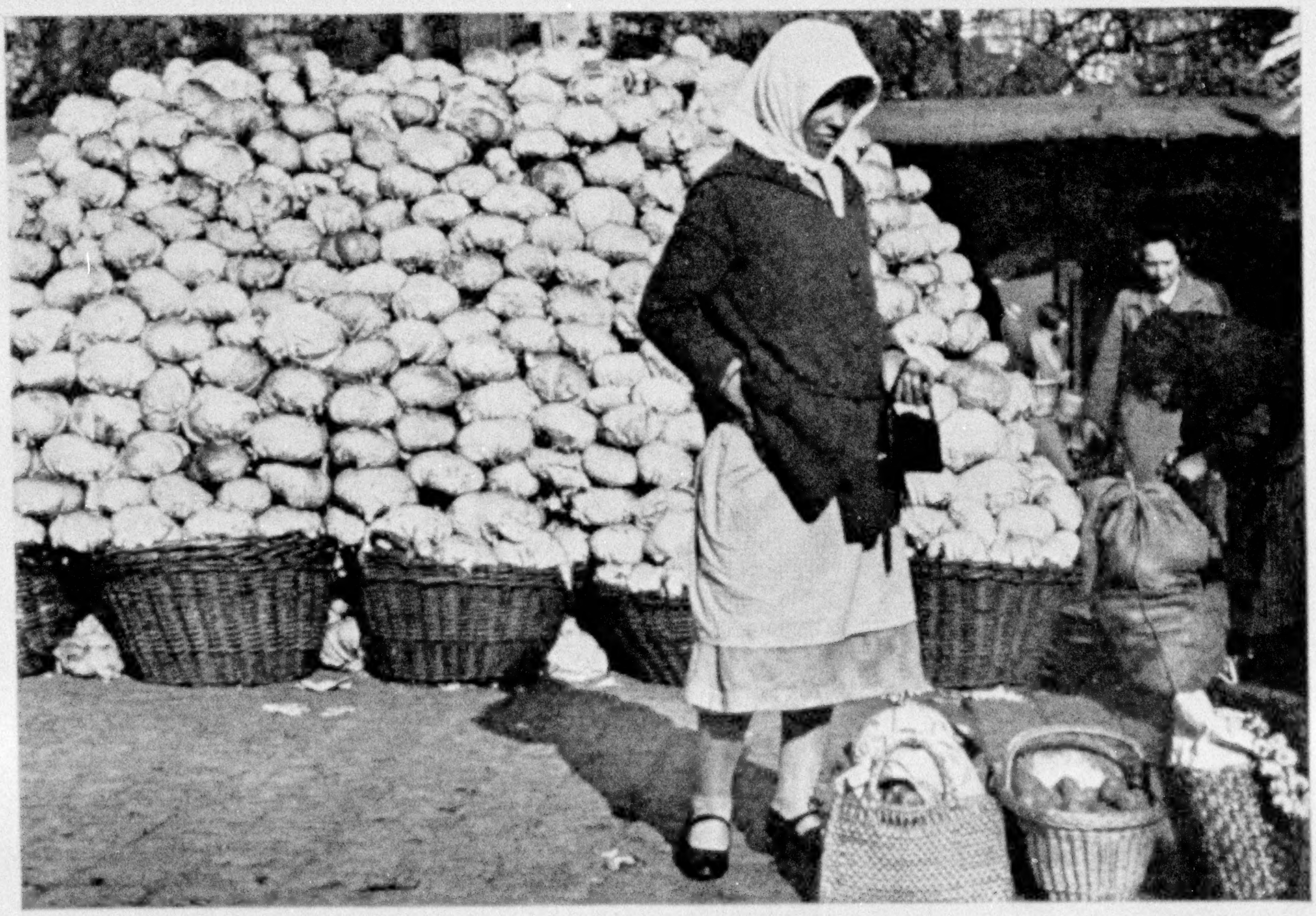
EVEN WILL ROGERS COULD LEARN ABOUT ROPES FROM HIM

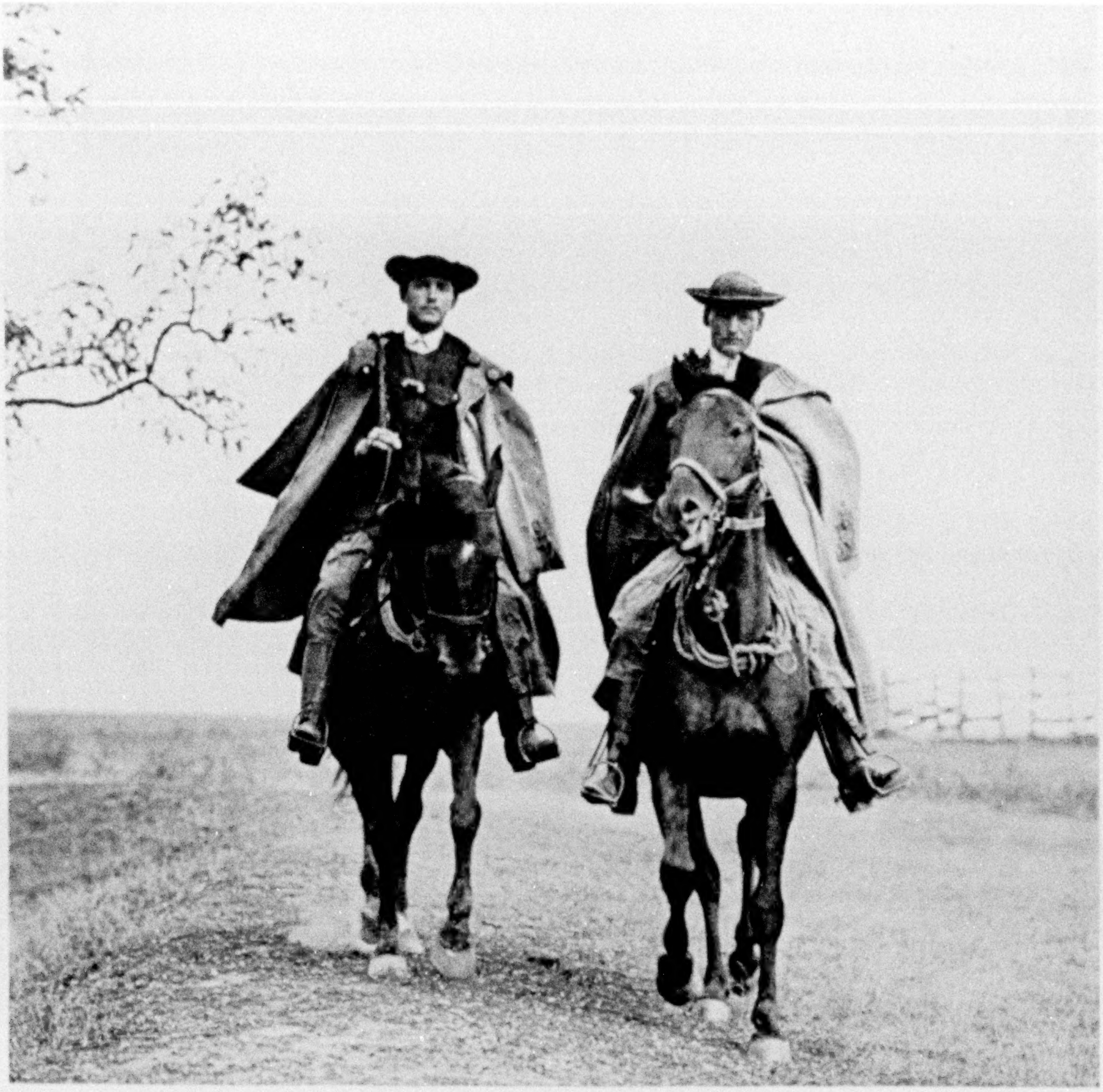
His skirtlike trousers and full sleeves in no way interfere with the ability of the Hortobagy cowboy to swing a lasso. He leads a wild and often solitary life on the great plains, but is never really lonely while he has the companionship of a horse. There are few riders anywhere to whom he has to acknowledge superiority.



Photograph by Melville Chater

CABBAGE IS CHEAP AND PLENTIFUL THROUGHOUT CENTRAL EUROPE

These particular heads are to satisfy the appetites of citizens of the Hungarian capital.



Photograph from Melville Chater

SOME OF THE WORLD'S FINEST HORSEMEN ARE COWBOYS OF THE HUNGARIAN PLAIN

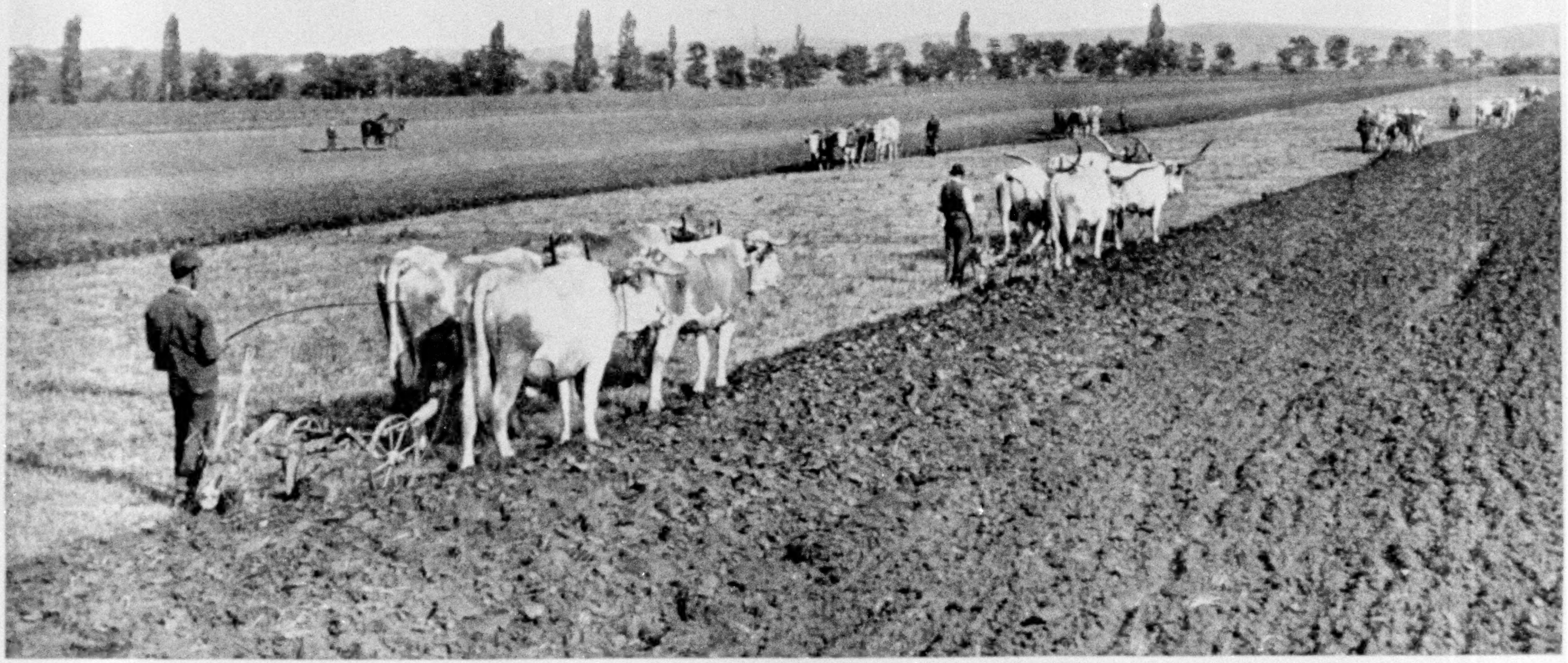
These men are born to the saddle. For centuries their ancestors have been horsemen, and in the days of mercenary troops Hungarian cavalry was always in widespread demand. They wear great white cape-coats richly embroidered in brilliant colors.

living in feud and fattening on public molestation. Not until the later Bulgars gained control between the Tisza and the Black Sea did Danubian commerce emerge from its long eclipse.

A VISIT TO DOLEFUL GYPSIES OF THE HUNGARIAN PLAIN

Our contact with the Alföld's gypsies occurred amid some crazy hovels adjoining the raveled-out ends of a village street. Against a background of dirt floors, paneless windows, filth indescribable, out rushed a gang of wild-eyed children, swarthy men, slipshod women, to see what they could sell us. Now, we were feeling rather depressed at the moment. "What, ho!" we said, rubbing our hands in joyful anticipation. "Wine! Music! Something snappy, something American!"

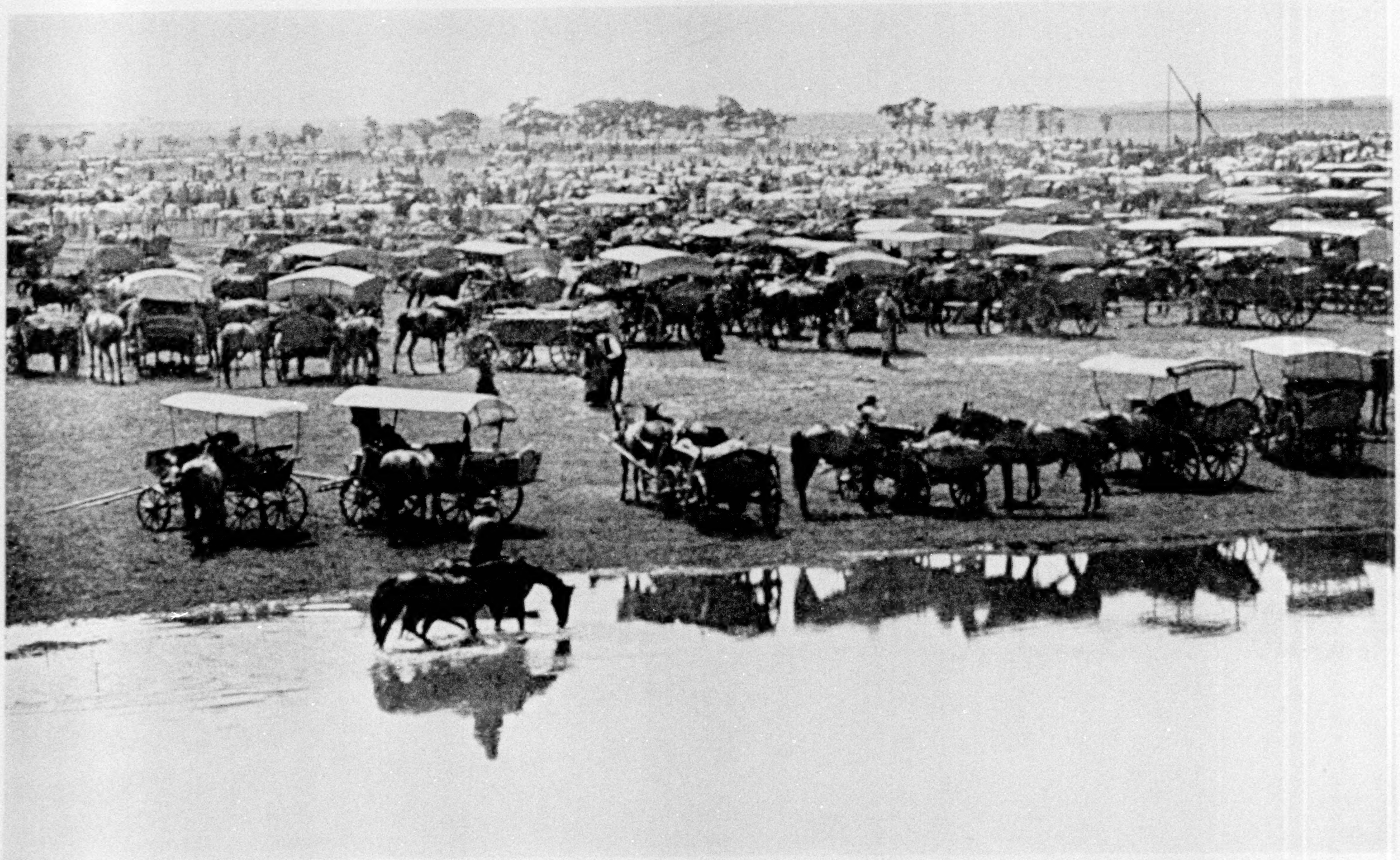
Now, whatever be the tune, your true Tsigane musician seems temperamentally unable to perform it except in wild and wavelike strains of abysmal despair. We relaxed ourselves for jollification, while guitar and mandolin struck up that merry little bygone ballad about "No bananas



Photograph by Ewing Galloway

MODERN PLOWS, DRAWN BY OXEN, BREAK THE LAND FOR WINTER WHEAT ON THE HUNGARIAN PLAIN

The farmers of this favored agricultural region are prospering now, as the country attempts to adjust itself to the new economic conditions arising out of the World War.



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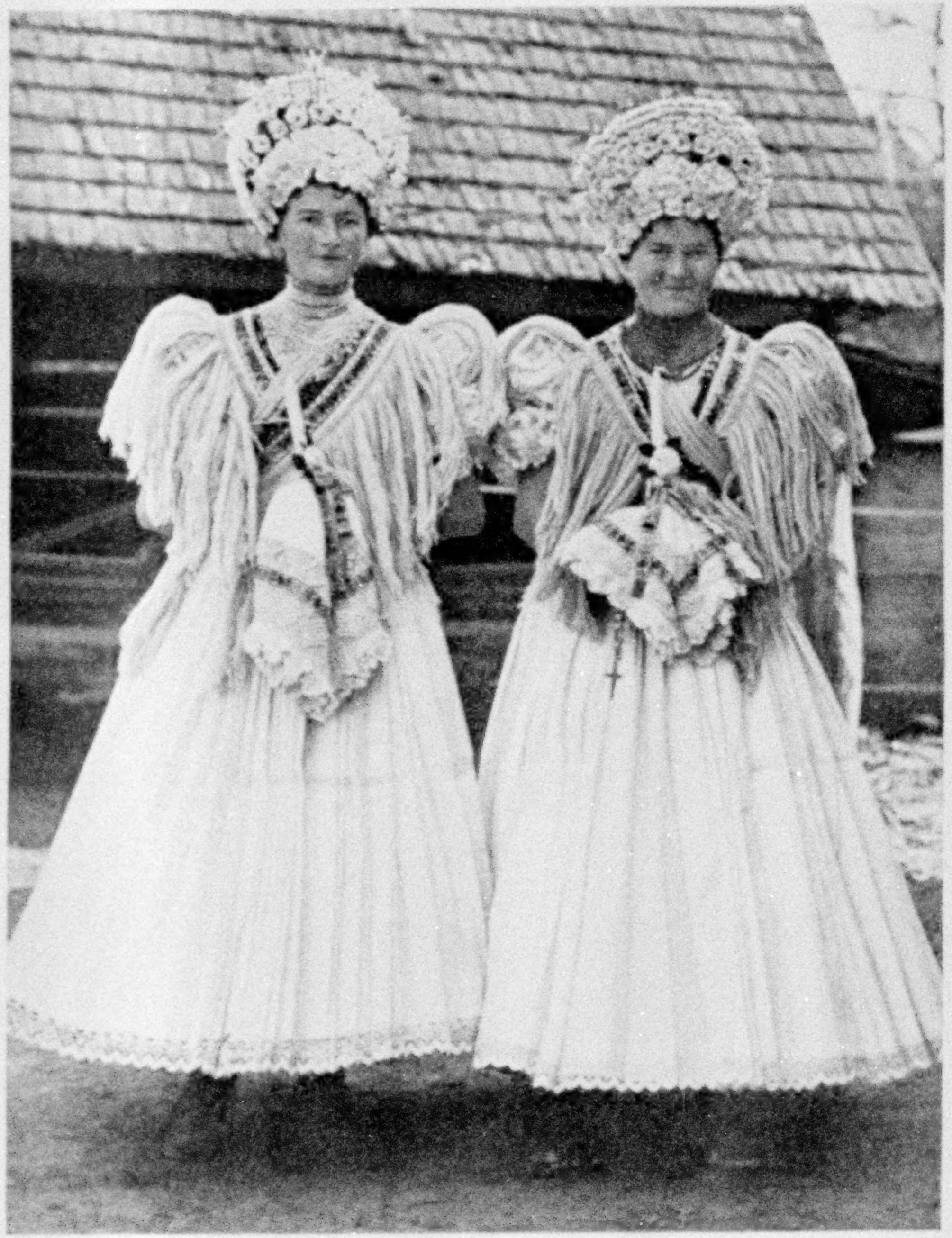
ONCE A WEEK HUNGARIANS COME TOGETHER FOR A GREAT HORSE MARKET ON THE HORTOBAGY PLAIN NEAR DEBRECZEN

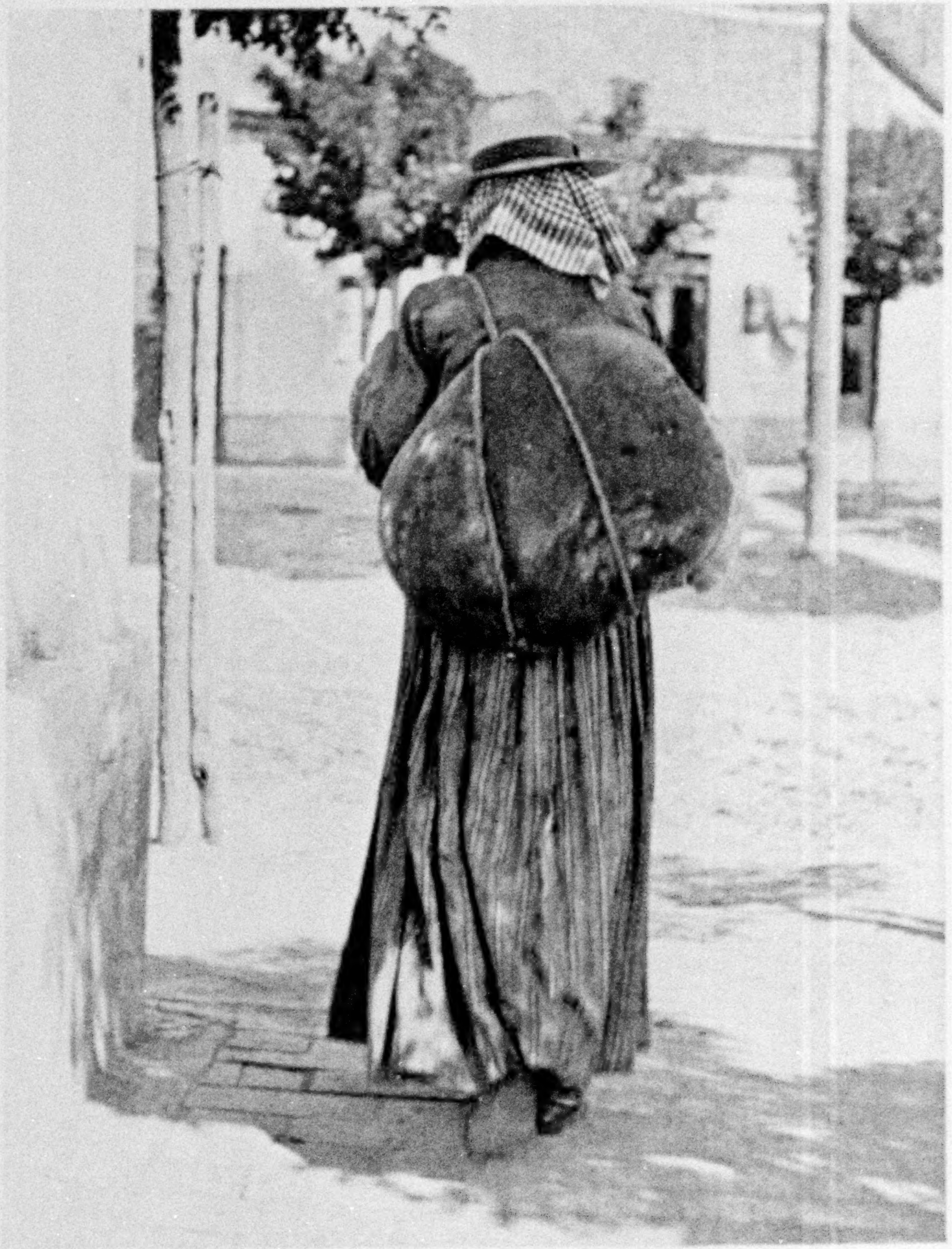
Although the innovations of a motor age are making themselves felt in Hungary as in other parts of the world, horses still hold a place of importance in the economic structure. The Magyars are very successful in breeding them and have developed a splendid strain of animals.



Photograph by Erdelyi

THEIR LACE CAPS IDENTIFY THEM AS BRIDES

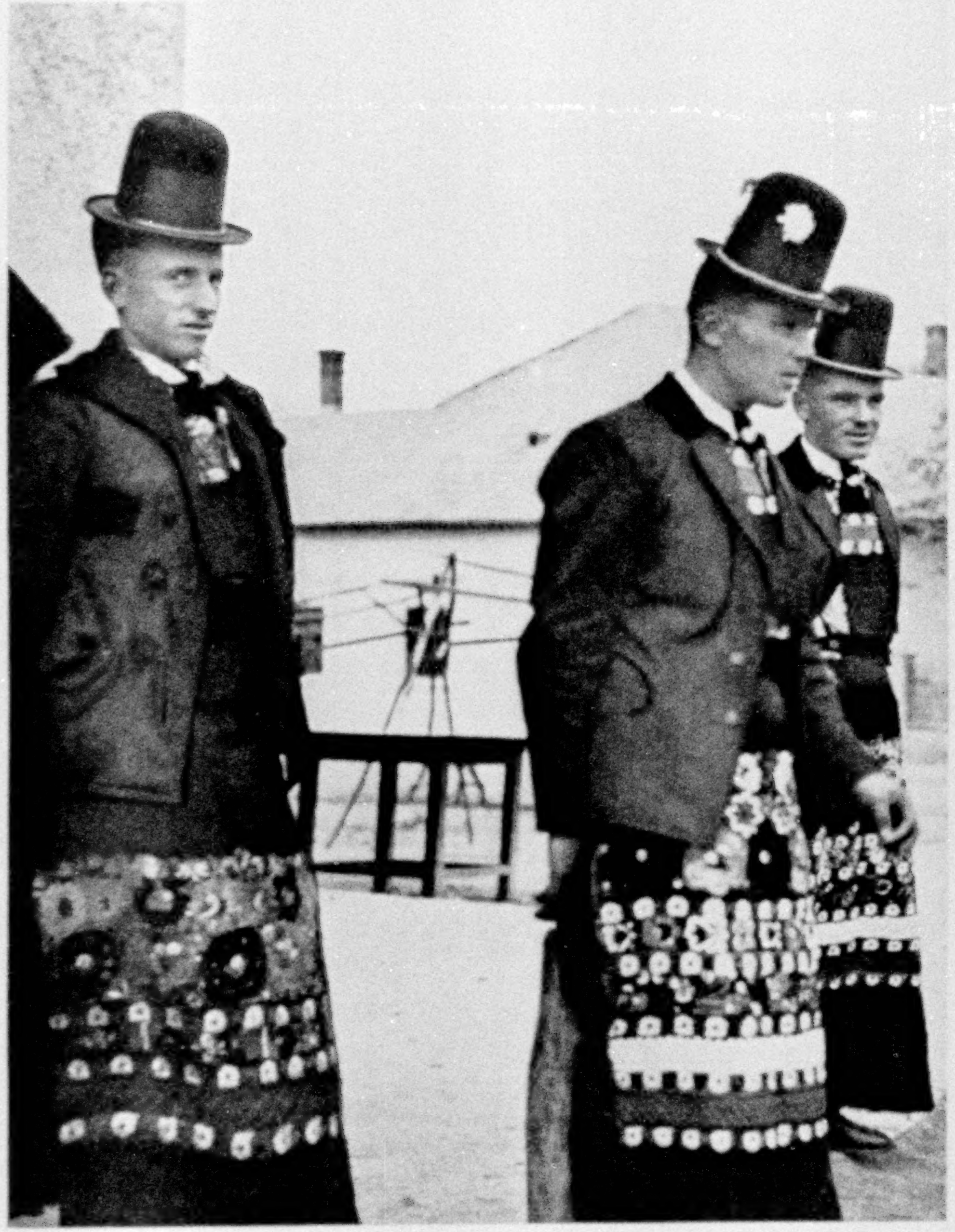
These girls of Mezőkövesd, a village of the Hungarian Plain east of Budapest, are members of a religious association for the encouragement of faith and the observance of church duties.



Photograph by A. W. Cutler

HER "DAILY BREAD" IS A SIZABLE LOAF

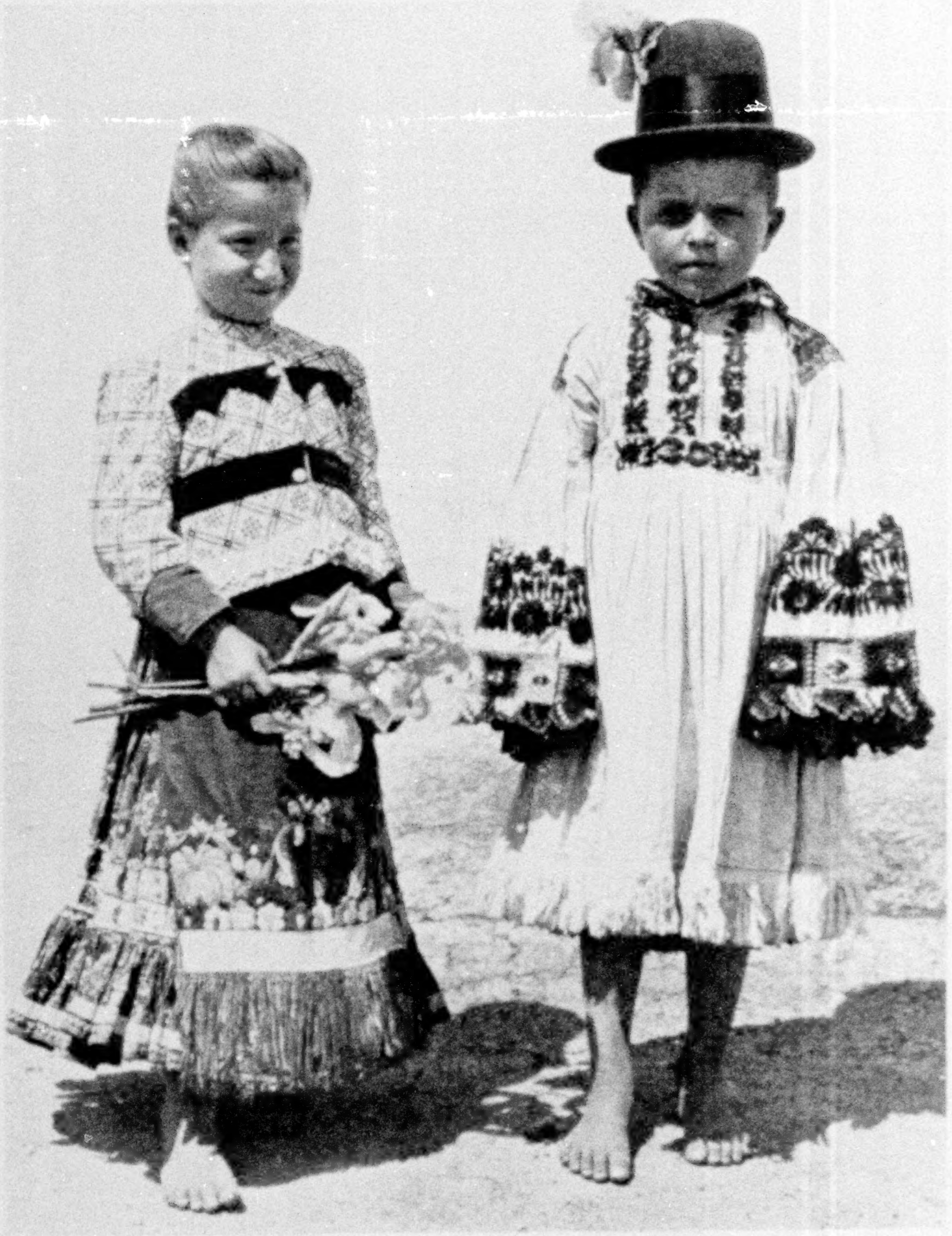
Made of rye flour, this bread keeps fresh for two or three weeks. It has a sour taste much appreciated by the Hungarian peasants (see, also, illustration, page 654).



Photograph by Melville Chater

RURAL BEAU BRUMMELS

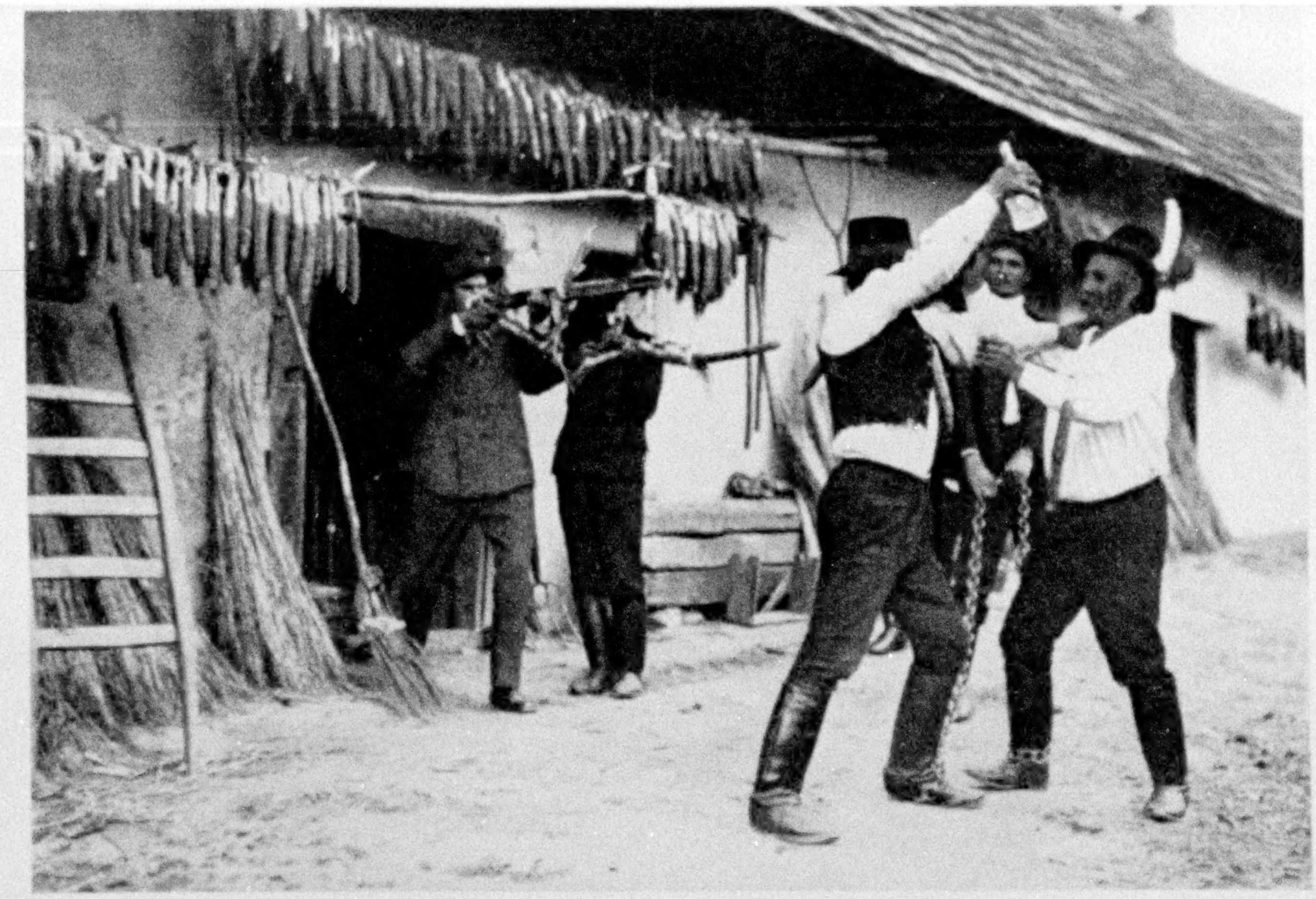
The male delegation in a Sunday afternoon fashion parade in Mezökövesd resembles a group of candidates for a fraternity initiation in America. The fringed aprons are black, decorated in orange, red, green, and purple, while the embroidered shirts are in rainbow colors on a white background.



Photograph by Ewing Galloway

MINIATURES OF THEIR ELDERS

The Sunday costumes of these children of Mezökövesd differ from those of their parents only in size. The Matyo people who live in this village, according to some authorities, may be descended from camp followers left behind by the Mongol hordes which overran Hungary centuries ago (see text, page 659).



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WHERE PROMPTITUDE IS A VIRTUE WELL IMPRESSED

Bacchus Play is an old national custom which persists in connection with marriage in the northern part of Hungary. The best man takes note of those guests who are late for the wedding feast, and on the following day he assembles musicians and "gendarmes," armed with tin plates and "rifles" constructed of vines, and goes in search of the late comers. After being feasted well with wine, their faces are sooted and their feet chained. They are marched around the village until late at night, stumbling over their chains and providing a mirthful spectacle for their neighbors. Finally flour is put on their heads and they are dragged to the well and a pail of water poured over them. At night their wives are allowed to come and free them from their chains.

to-day." But the Tsigane interpretation sounded somewhat as follows:

"Yes—but that was yesterday
When, in some sobby-sobby Eden
Or yearny-yearny Hesperides
That golden fruit was ours.
But to-day—Oh, wretched outcasts, we,
Oh, the inexorably irretrievable!—
We have no bananas to-day!"

It was enough to cause a banana addict to renounce that fruit for the rest of his life.

BREASTING THE RUSHING DANUBE AGAIN

We returned to Budapest and tug life. Bridge after bridge fell astern, as the *Patria* headed for that cliff-fringed section of the Danube where it makes its big turn westward. Our paddle wheels churned no less briskly than those of the river's floating grain mills, set amid a current that rushed past at six feet per second; but we really didn't comprehend its speed until we sighted our first Danube raft. Somewhat resembling a dog kennel on a plank, it raced downstream toward us until we could see that it consisted of a wide expanse of milled timber supporting a living shack and several German raftsmen. One of the men was steering with a huge oar, two more sat back to back on a keg, and all three were the gloomiest-looking mortals imaginable.

"Where from?" yelled our skipper.

"Black Forest!" the steersman yelled back.

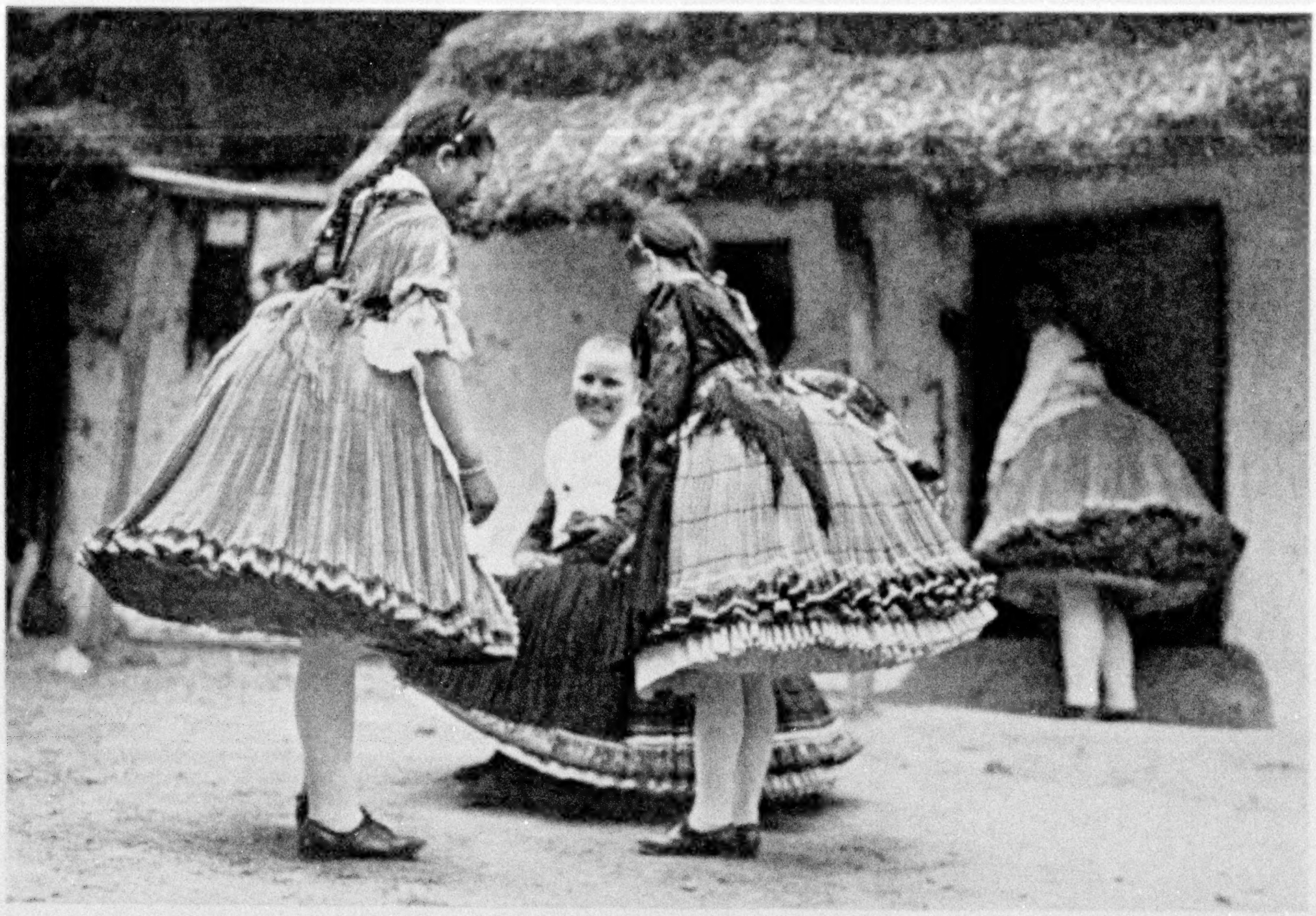
"Plenty food aboard?"

"No; next to nothing."

"No bread or sausages?"

"Yes, plenty; but the beer keg's run dry!"

Ahead rose the Little Carpathians, forming the background of a busy port scene of quays, cranes, canal boats clustered



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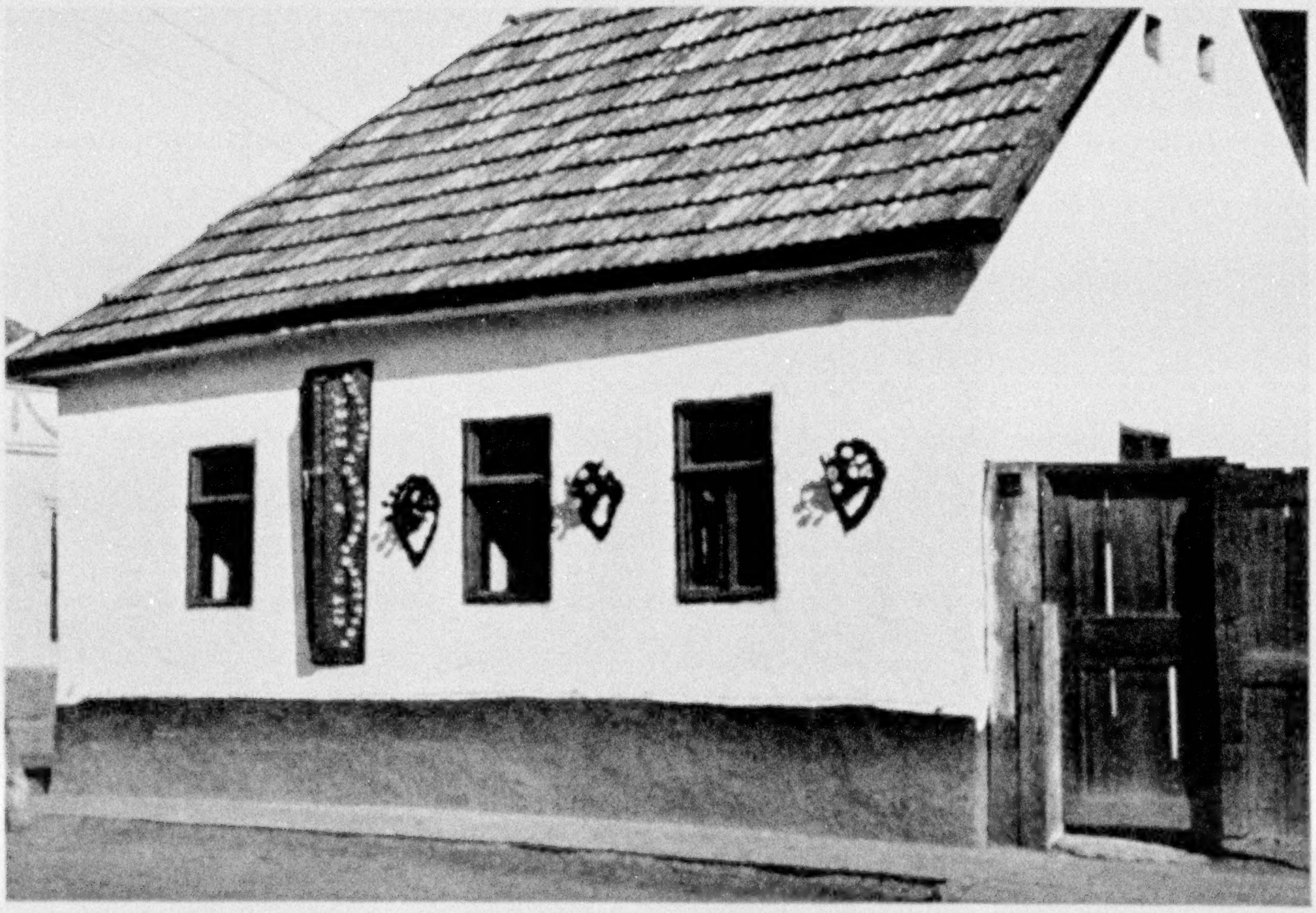
THEIR SKIRTS ARE MANY, WIDE, AND SHORT

In some Hungarian villages as many as ten petticoats are worn, one over another, and some of these contain about ten yards of material drawn into tiny folds at the waist.



Photograph by Melville Chater

DEATH HAS PUT ITS MARK UPON THIS HOME

Among the Matyo people of Mezökövesd (see, also, pages 664-665), the custom is observed of announcing death by attaching an empty coffin to the outside of the deceased's house.

in slips. When the *Patria* had tied up, we went ashore for a stroll in what our German guidebook called Pressburg.

We ascended to the town's castle-topped summit. It commands a splendid panorama of the Danube's two arms encircling the Great Schütt, which local pride proclaims "the largest interior island in Europe."

"How do you like Pozsony?" asked a venerable, patrician-looking gentleman at our side.

"Pressburg, you mean?" we inquired.

"Nonsense!" he snapped. "Am I not a Hungarian? Weren't our kings crowned here for centuries? Pozsony, if you please!"

We descended to the quay, and there we fell into conversation with a young Czechoslovak. He showed us the extent of postwar constructions that give this transshipment port for grain, coal, metals, and textiles a handling capacity of 3,000,000 tons a year (see pages 682, 684).

"A busy town, Pozsony!" we commented.

"Pozsony?" he returned warmly. "This is the Czechoslovakian port of Bratislava!"

We begged his pardon, and we would have been perfectly contented with his correction if, upon our return to the tug, a German bargee hadn't greeted us with "Vell, how you like Pressburg?"

A SIDELIGHT ON 2,000 YEARS OF DANUBE HISTORY

And there you are—one river port variously named by three nationalities, each name bearing for each nationality a peculiar cultural significance! Here is a striking sidelight on that timeless shift of peoples and powers which is so largely the story of the Danube.

Not all the conquests of Trajan, Attila, Charlemagne, Genghis Khan, and Napoleon have altered the Danube's enduring characteristic of ethnographic ununiformity. With the Orient at its mouth and the Occident at its source, the passage of 2,000 years has not modified its striking contrasts in cultural levels. The rise and fall of empires on its banks have but brought the reshuffling of ever-diverse peoples. And some of those reshufflings have been colossal. As a result of the World War, 58,000,000 Austro-Hungarian subjects regrouped themselves in the succession States and elsewhere.

HAINBURG SAW 1,000 "NIBELUNGENLIED" KNIGHTS MARCH TO THEIR DEATH

Beyond Bratislava we skirted Hainburg, a hillside picture of town walls, curious gates, crumbling towers. It is one of half a dozen Danube towns mentioned in the "Nibelungenlied" as being associated with the downstream journey of Burgundy's doomed knights.

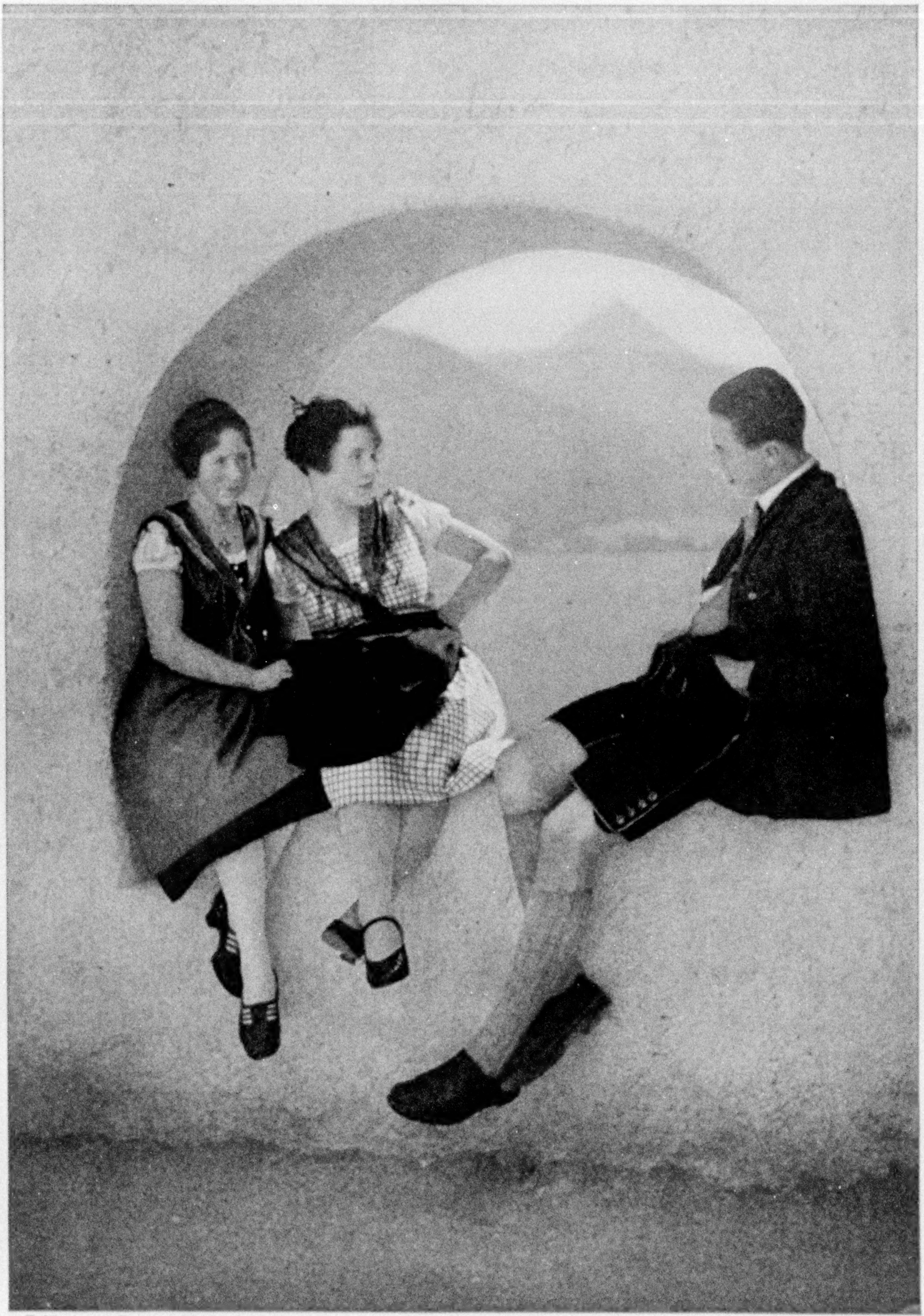
In the Middle Ages the "Nibelungenlied" corresponded to our modern crime story. Not that there was anything in it to unravel, for those were the frank days of murder without mystery, when, instead of invoking abnormal psychology, one referred murders to a blood curse.

When Hagen slew Siegfried in Burgundy, there was no need to page some legendary Sherlock Holmes. Everyone recognized that the murder was due to the Nibelungs' curse. Kriemhild, the deceased's widow, became the queen of King Etzel (Attila), withdrew to his castle on the Danube, and grimly bided her time. Then, when the late unpleasantness had blown over, she dispatched messages to Burgundy, inviting a thousand knights, including the guilty Hagen, to visit her.

Ignoring the prophecies of friendly mermaids, gaily the maildight thousand descend the Danube to Etzel's court. And now Kriemhild stages the festal scene for murder without mystery. Instead of dropping poison into Hagen's beer, she fires the banqueting hall; whereupon the Hungarian knights fall upon the Burgundians until all are extinguished in flame and blood. No unraveling is necessary: the Nibelungs' curse is to blame. Nothing simpler, my dear Watson!

VIENNA'S UNIQUE BLOCK APARTMENTS

Beyond Hainburg the Danube's banks lowered into the wide plain where lies Vienna. The captain, saying that he would like to show us something of postwar Vienna, took us to his apartment. It was situated in a big, modern edifice facing on two avenues and inclosing a courtyard of such dimensions that all of the building's balconied windows, rising in tiers, received daylight and an ample view.



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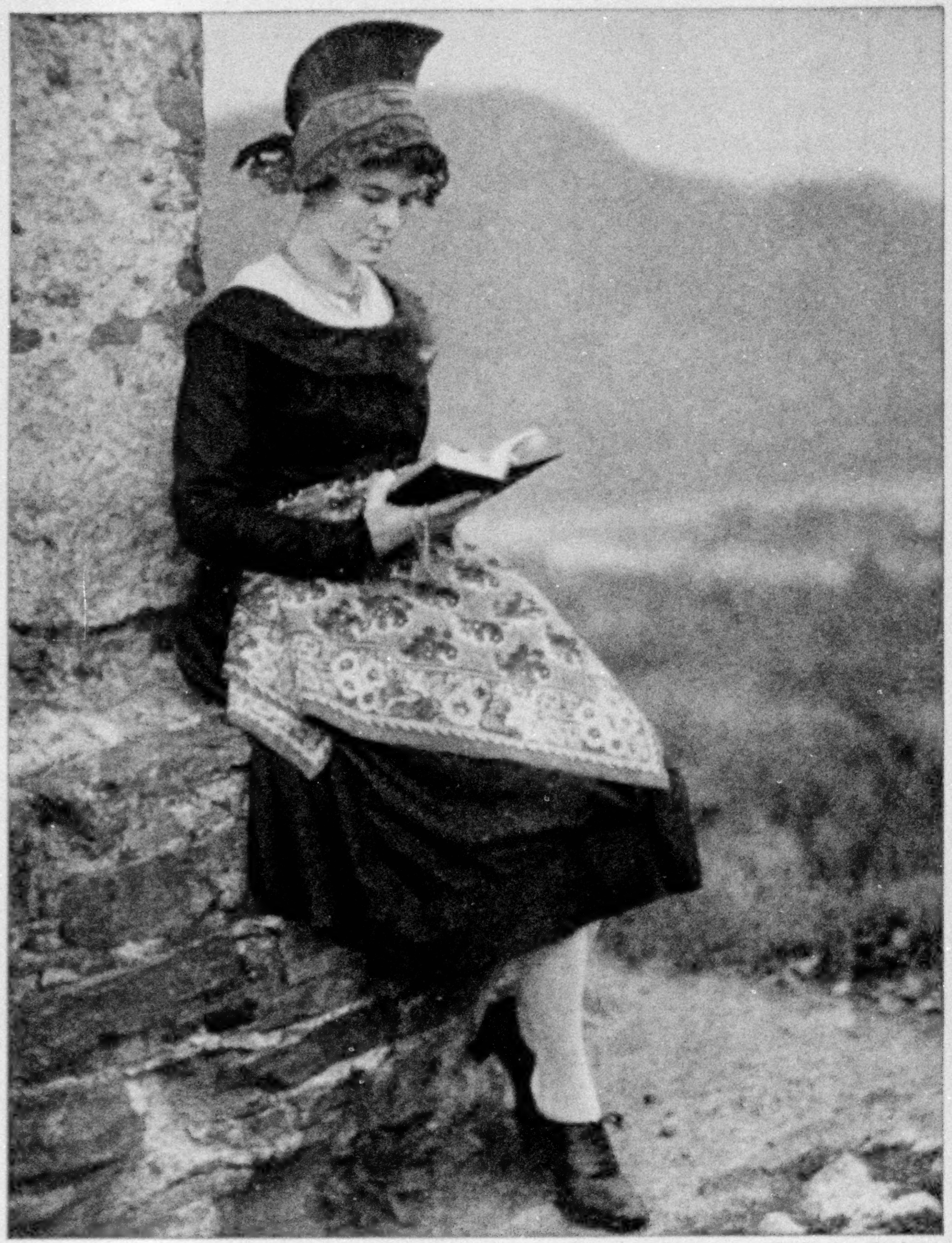
ST. WOLFGANG'S ARCHES MAKE DELIGHTFUL WINDOW SEATS

These young folk of the most important market center on the Abersee are perched in an opening in the arcade wall surrounding the court of the town church. Legend says the patron saint flung his hatchet from the distant peak of the Falkenstein to the spot on the lake shore where his shrine now stands.



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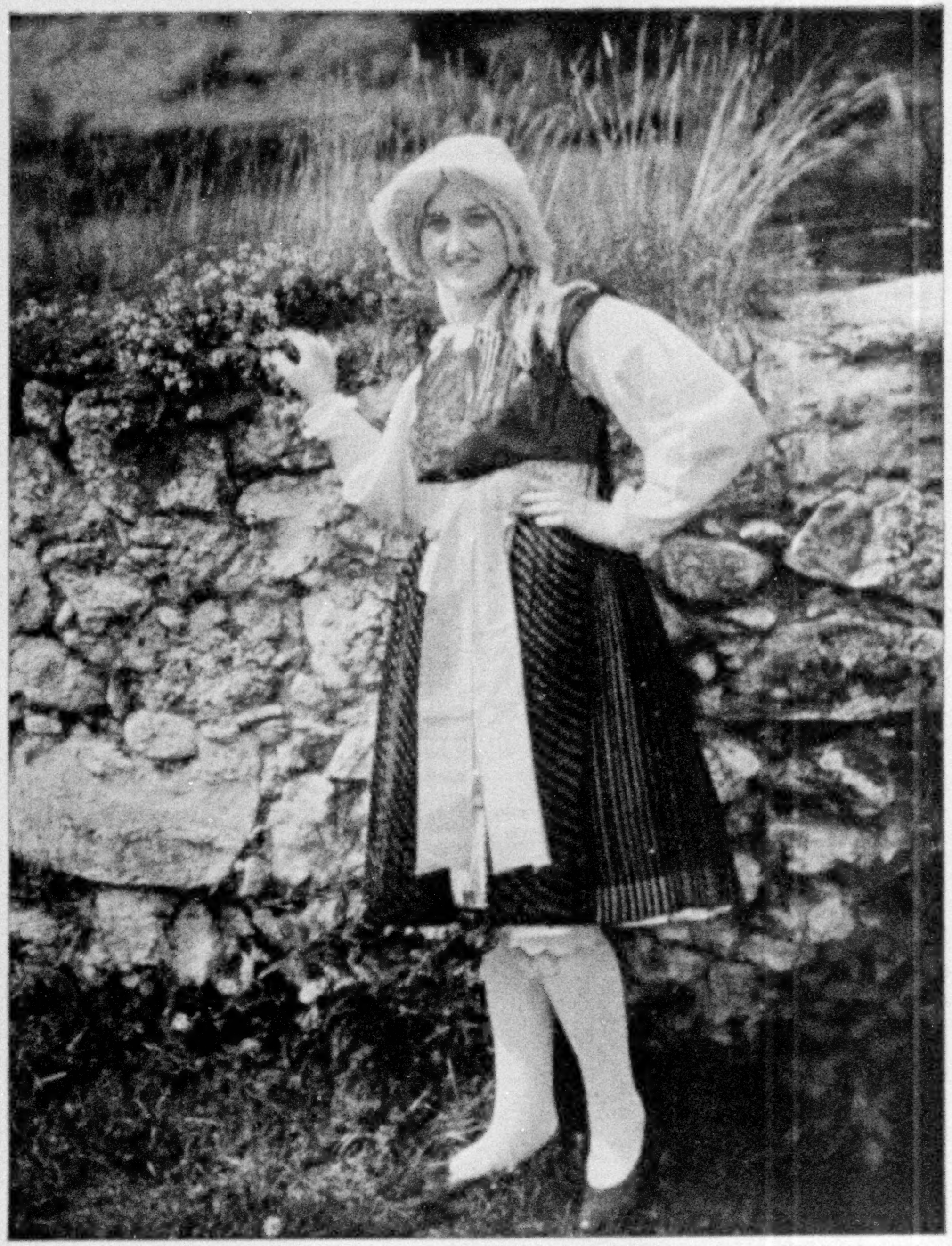
ROMANCE LIVES IN THE VERY AIR OF THE WACHAU

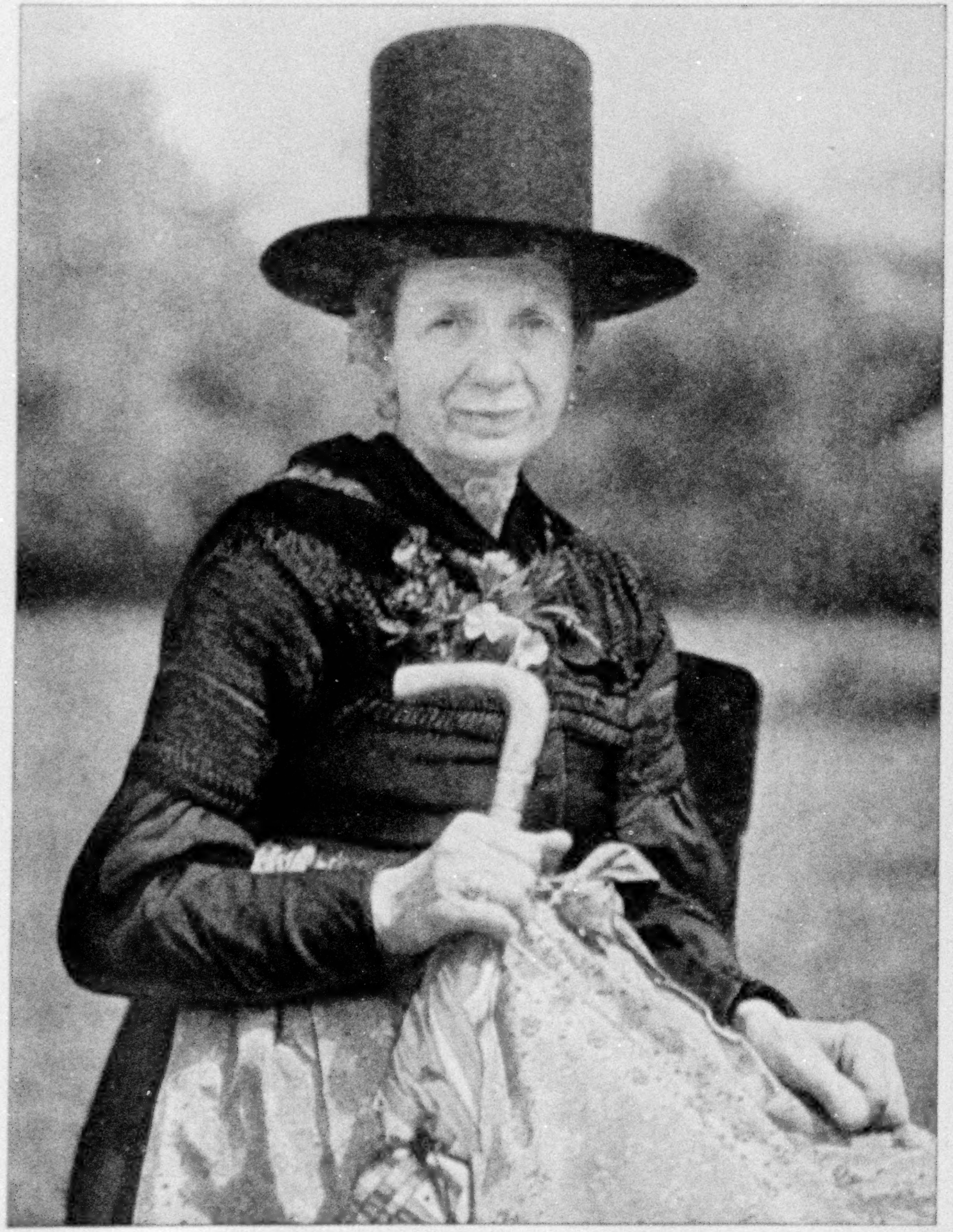
Wearing an old-time folk costume, the girl of Spitz on the Danube has found an ideal place to read a tale of chivalry. In Dürnstein Castle, only a few miles away, Duke Leopold VI held Richard the Lion-heart prisoner in 1192-3.



Autochrome by Hans Hildenbrand

COQUETRY SMILES IN A BEWITCHING FOLK COSTUME

A pretty girl of Nötsch, a tiny village in the Gailtal west of Villach, shows justified pride in her dress, which from gay garters, coyly displayed below the knee, to closely pleated cap, is a triumph of the needleworker's art.



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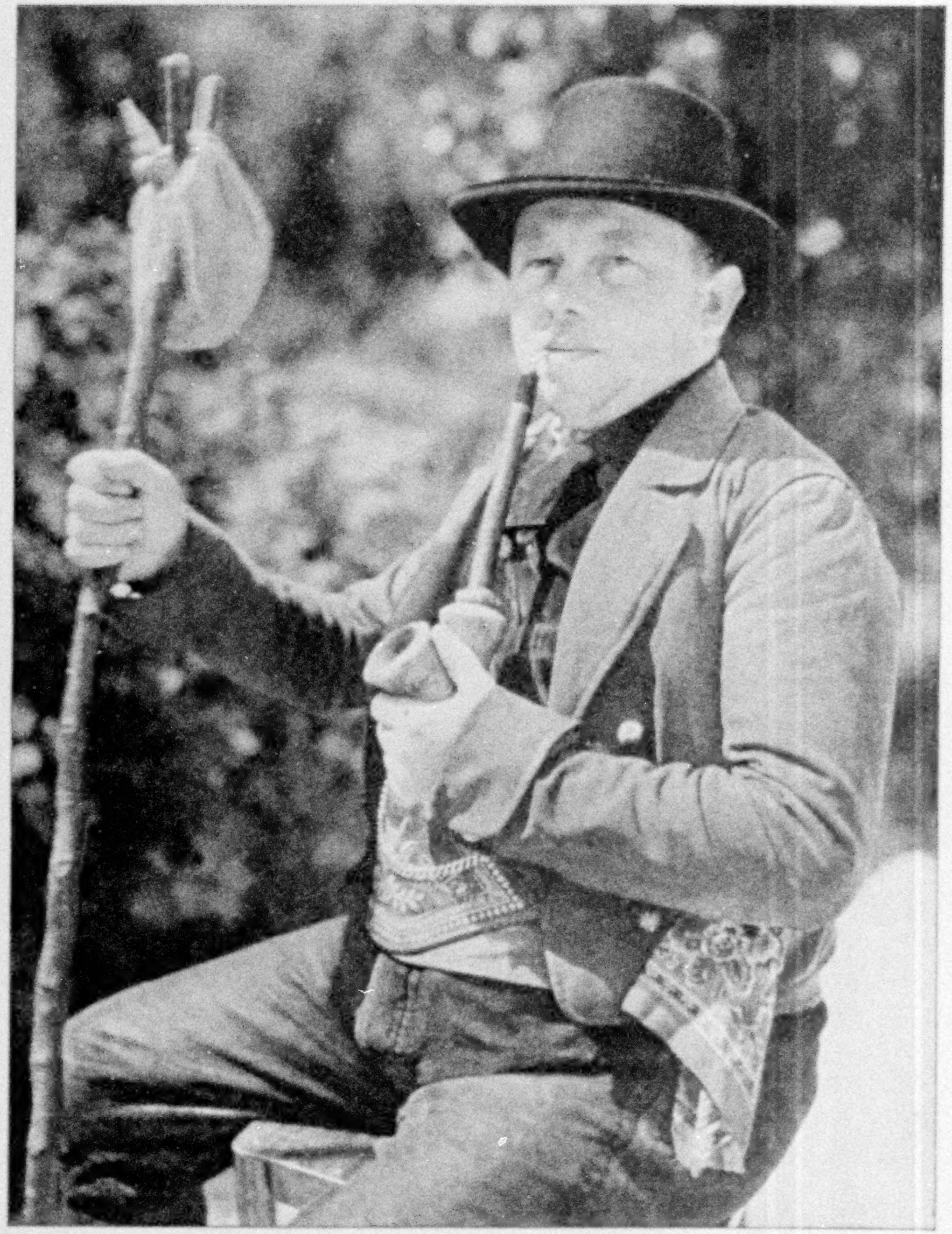
MODEST DIGNITY CHARACTERIZES THIS PEASANT WOMAN

Though Bischofshofen has become a bustling modern town, the central point of junction for express trains connecting Vienna and Paris, south Slavonia and Salzburg, some of the older peasant women cling to the costume of other times.



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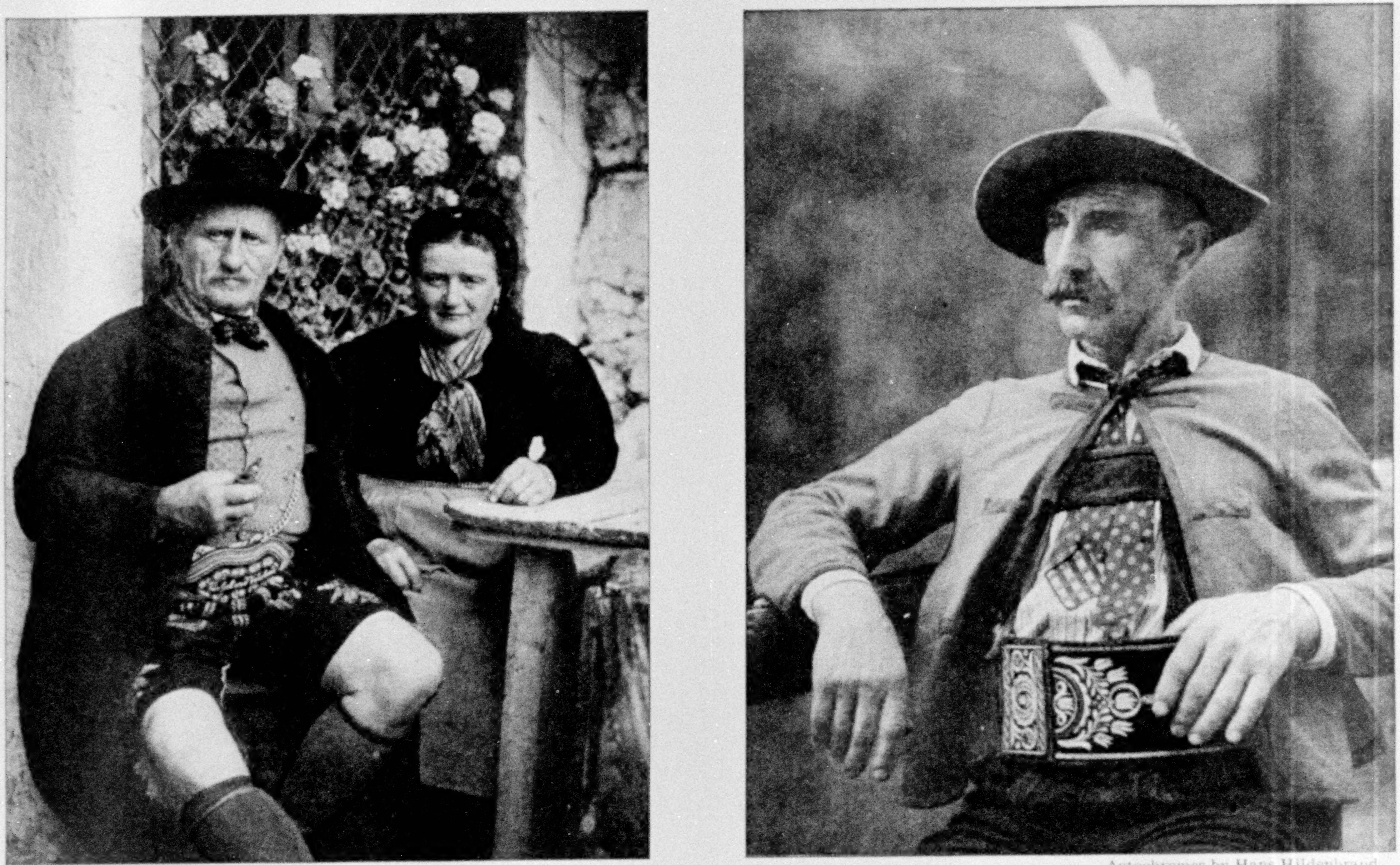
IN GALA ATTIRE THE CRAFTSMAN IS A DASHING FIGURE

With capacious pipe in hand and a bit of bacon and bread in a handkerchief slung over the fork of his walking staff, the worker from the country near Salzburg is ready for an enjoyable day at the market or festival.



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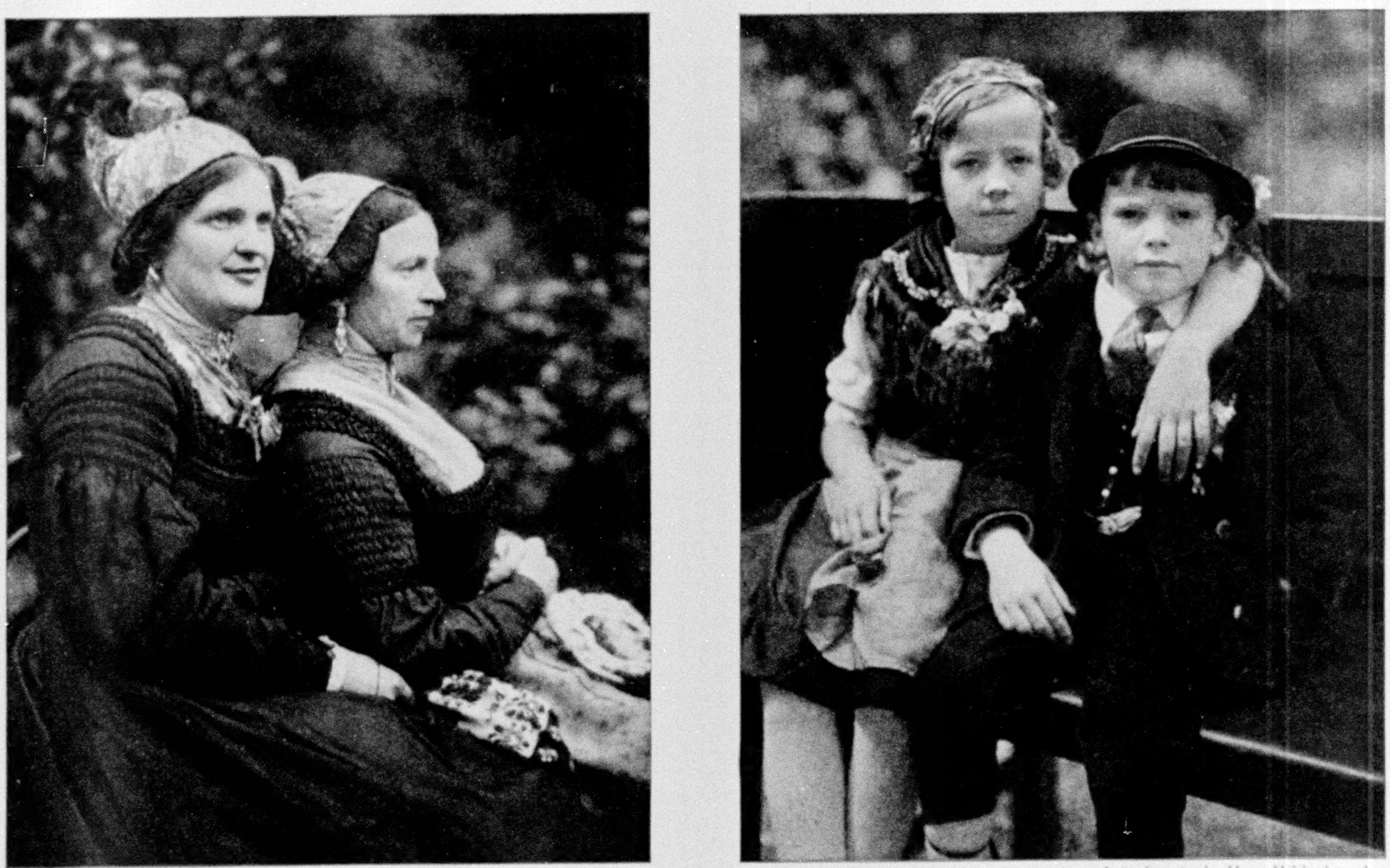
PEASANT CHARACTER IS AS STURDY AND UNCHANGING AS THE ALPS

There is something fine and proud in the calm adherence of these mountain people to their traditions of dress and custom. The robust couple live near Heiligenblut, a Carinthian village that owes its name to a phial of the "holy blood" said to have been brought from Constantinople by a saint and now kept in the 15th century church. The man with plumed hat and elaborately decorated belt is from Birnbaum in the Gailtal close to the border of Italy. During the World War his town was within range of the Italian guns.



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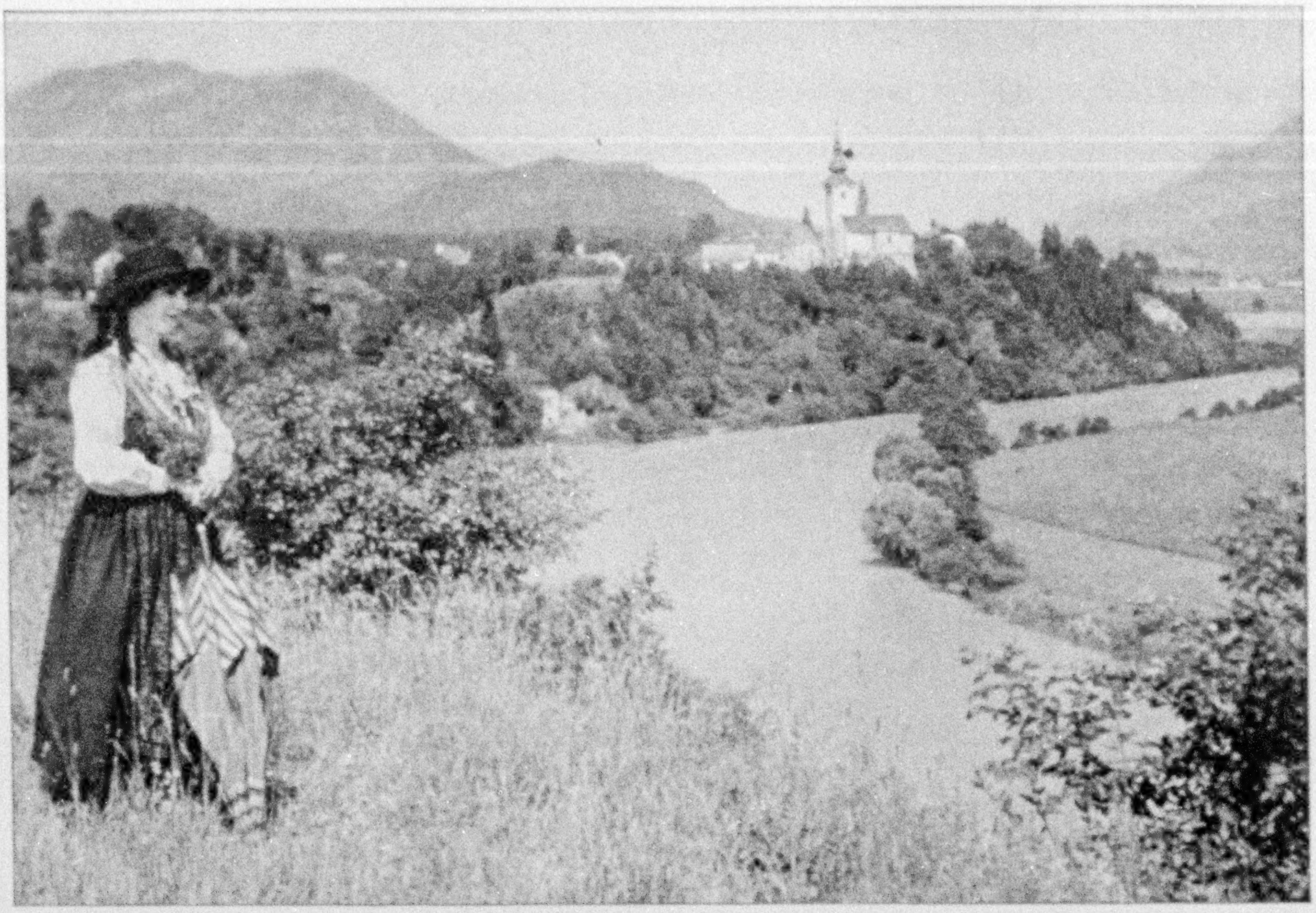
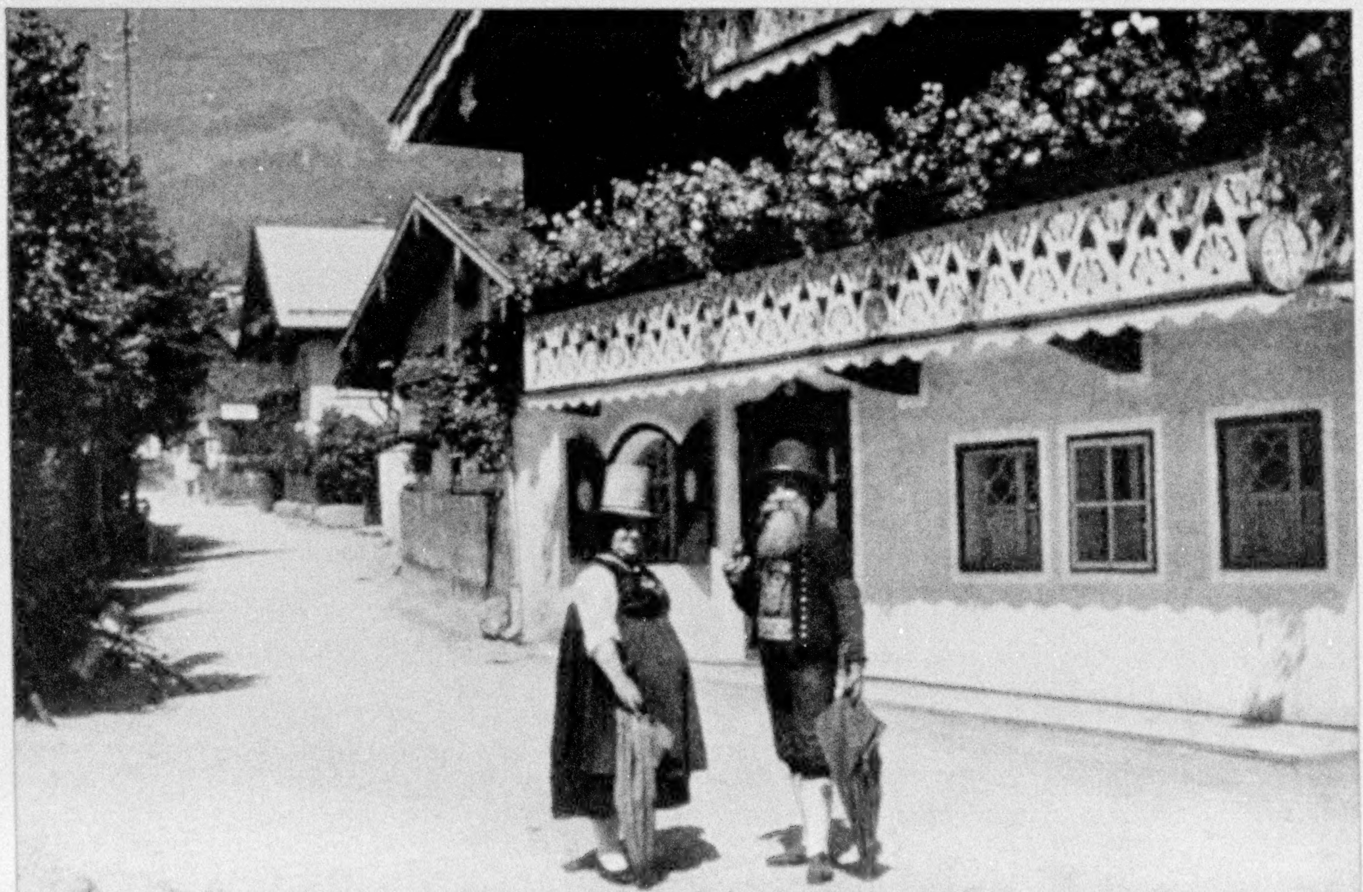
SALZBURG FOLK HAVE BEEN SLOW TO ADOPT MODERN STYLES

Peasant art and costumes are disappearing from many parts of Austria, but here the traditional attire may still be seen, particularly on fête days. The women are wearing the cherished caps woven of gold thread and embossed. The children's quaint garb has been changed little for the modern generation.



WIDE AND FERTILE IS THE VALLEY OF THE DRAVE

Though a thriving industrial center and the depot of the timber trade with Italy, Villach, second largest city in Carinthia, lures the traveler by the loveliness of its pastoral surroundings. The young woman wears a characteristic peasant costume.



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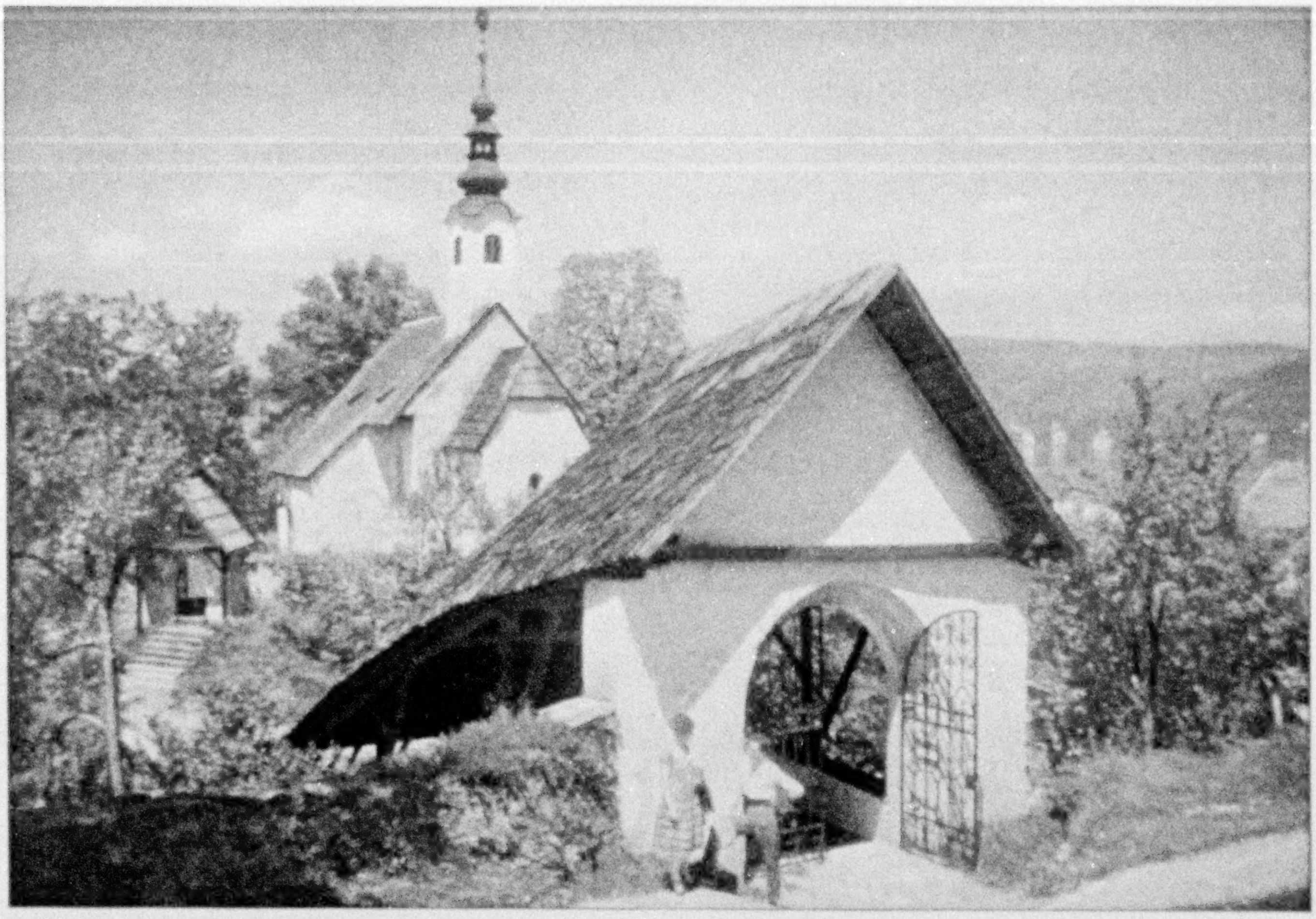
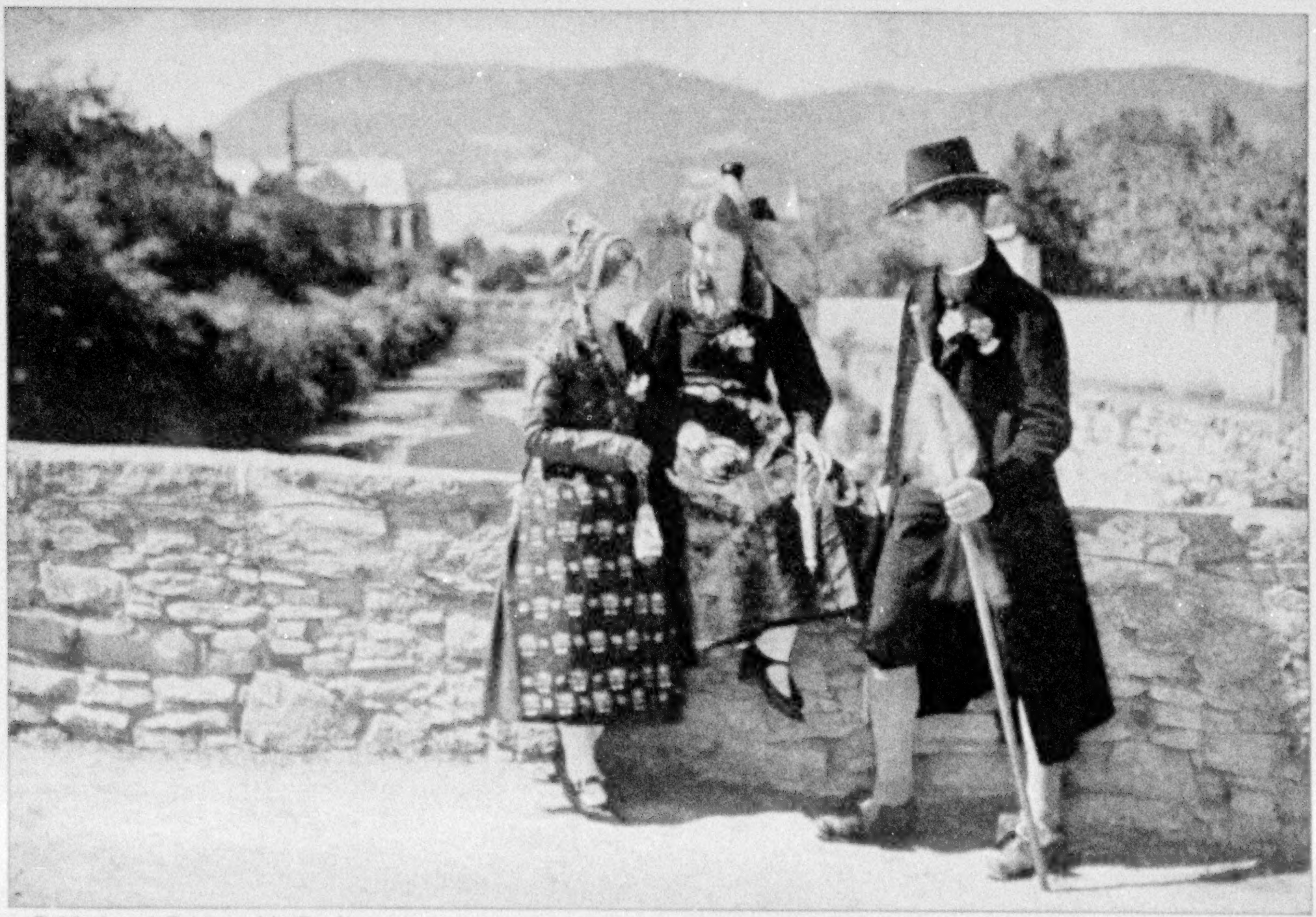
THOUGH A FAVORITE RESORT, ZELL AM SEE REMAINS UNSPOILED

Beside the jewellike Zeller See, a lake only two and a half miles long and a mile wide, but 225 feet deep, this quaint Alpine village attracts thousands of tourists both winter and summer.



CHURCH-GOING FOLK HAVE WORSHIPED HERE FOR 1,300 YEARS

One of the most interesting places in Carinthia is Maria-Wörth, on a peninsula in the Wörther-See. The ancient church is believed to date from the 6th century. Approached by the covered stairway is a second historic chapel hidden by trees.



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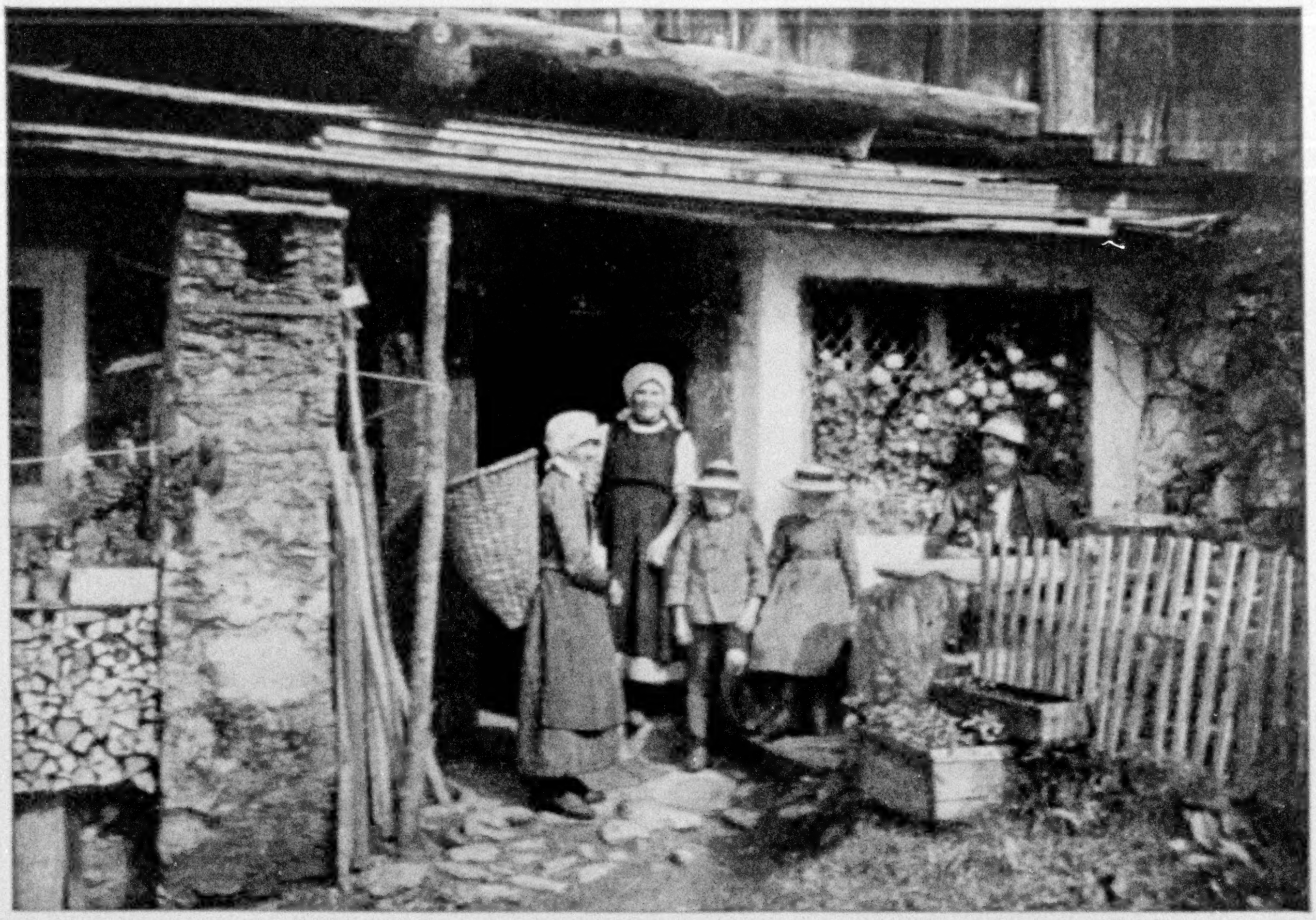
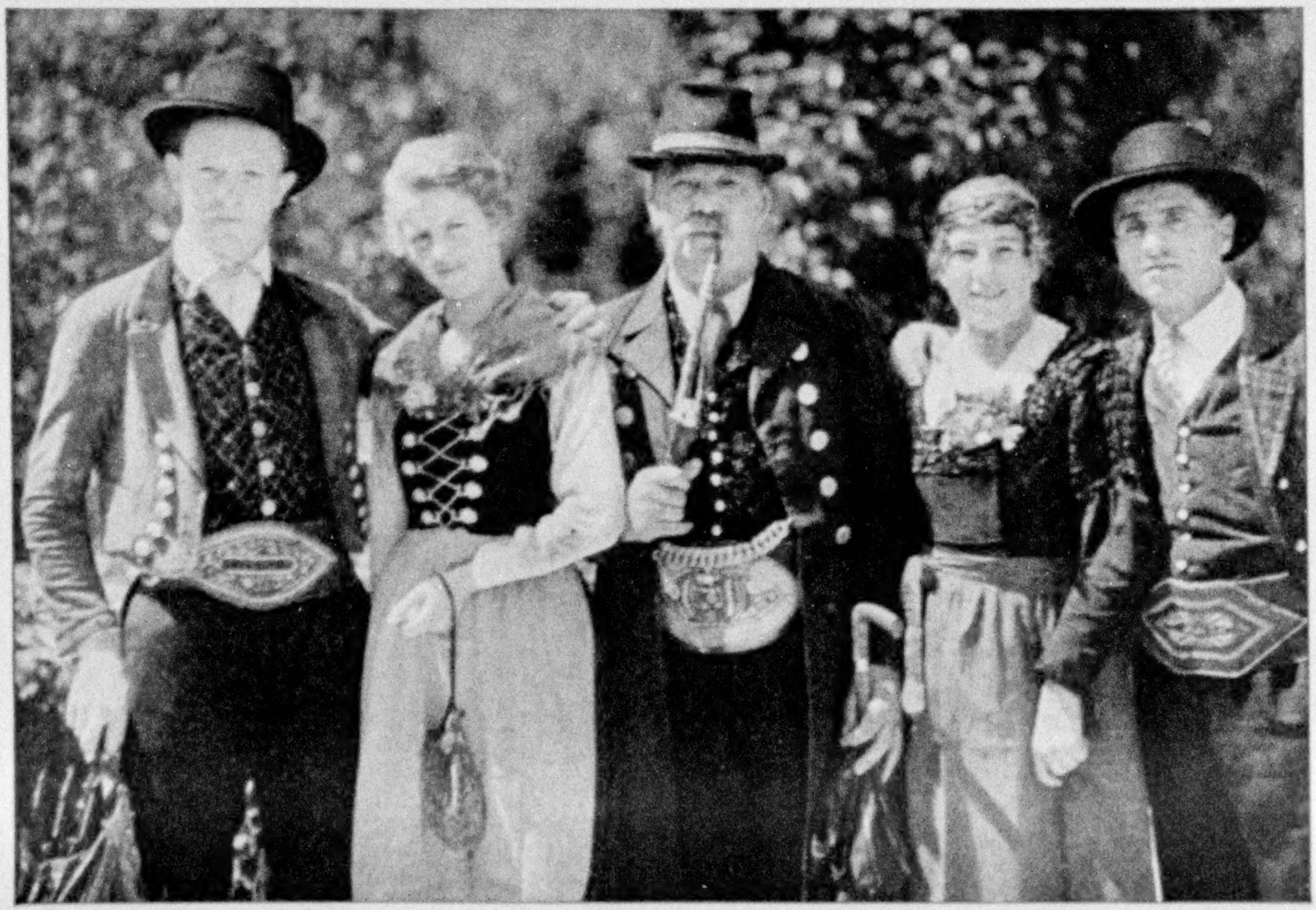
WALLS AND MOATS OF FRIESACH RECALL FEUDAL TIMES

Appropriate to the medieval setting are these young people's folk costumes. Near the town are the half-ruined castles of Petersberg and Lavant. The Dominican church dates from 1251.



THRIFT MAKES HAPPY HOMES IN HEILIGENBLUT

Although the peasant farmer of Carinthia admits the convenience of modern improvements, he somehow prefers to cling to the work methods of his ancestors. The house before which this healthy family is gathered has been handed down from father to son for many generations (see also Color Plate IV).



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THE FARMER'S FAMILY IS A CLOSE-KNIT SOCIAL GROUP

Regard of class and love of the soil characterize the peasants of Gnigl, near Salzburg. In keeping with time-honored custom, when the eldest son marries he becomes head of the house and his parents move to the smaller dowerhouse. Preservation of traditions of both dress and of labor is a matter of pride with these people.

Crossing the pergola-edged courtyard, where tenants' children were asplash in a cement wading pool, we entered that curiously futuristic-looking structure and gained a small apartment consisting of three daylit, airy rooms.

"Now you've seen one of Vienna's municipal block apartments," the captain announced.

"Do you mean," we asked, while contrasting our attractive surroundings with that bugbear of "institutionalism" which is supposed to blight such social experiments, "that this enormous flat-house is city-built, city-administered?"

He nodded. "You see, something had to be done about house-shortage and high rentals. Before the war one-fourth of a workingman's pay went for rent, while now—well, this apartment, together with gas and electricity, costs me about $5.00 a month."

And thus, due to postwar exigencies, Vienna has achieved for its working classes a housing scheme which, planned to embrace 30,000 families, is "futuristic" only because of its novelty (see illustration, page 691).

When one visits the delightful block kindergartens or the block laundries, where workmen's wives "do" their household linen, or the courtyard playgrounds, where workmen's children scamper, it seems as if some lamp-rubbing genie had obliterated yesterday's dreary tenement and planted to-morrow's community home in its place. Surrounded by a block apartment's thousand or more souls, living among conditions of health and cheer, one experiences—again the inevitable word—a singularly futuristic impression, as if beholding the advent of a new era for industrialism's centers.

VIENNA HAS TRANSFORMED ROMANCE INTO REAL ESTATE

In striking contrast to the block communities of a socialistically inclined government are the superb edifices of Austria's 600-year-old dynasty that ended with the World War. Vienna is a city of palaces and of those palatial buildings which fringe her matchless Ring. By selling the site of her medieval "ring" of ramparts for $50,000,000 and by creating instead a circular boulevard of architectural splendors unrivaled in Europe is how Vienna in mid-19th century transformed romance into real estate and became possessed of her famous Ring-Strasse (see page 690).

"L'AIGLON'S" FORMER PALACE NOW AN ORPHANAGE

A visit to one Viennese palace of many—the Schönbrunn of Versailles-like aspect—reveals the luxury of the Hapsburg régime and its postwar *sic transit* under Austria's democratic republic; for the park where Maria Theresa once strolled and where the Napoleon of 1805 planned campaigns has become a Sunday pleasance of Vienna's workers. The interminable succession of rooms, wherein "L'Aiglon," the sickly little son of the deposed Emperor of the French, wandered and fretted and withered away, is now in part a civic orphanage (see page 693).

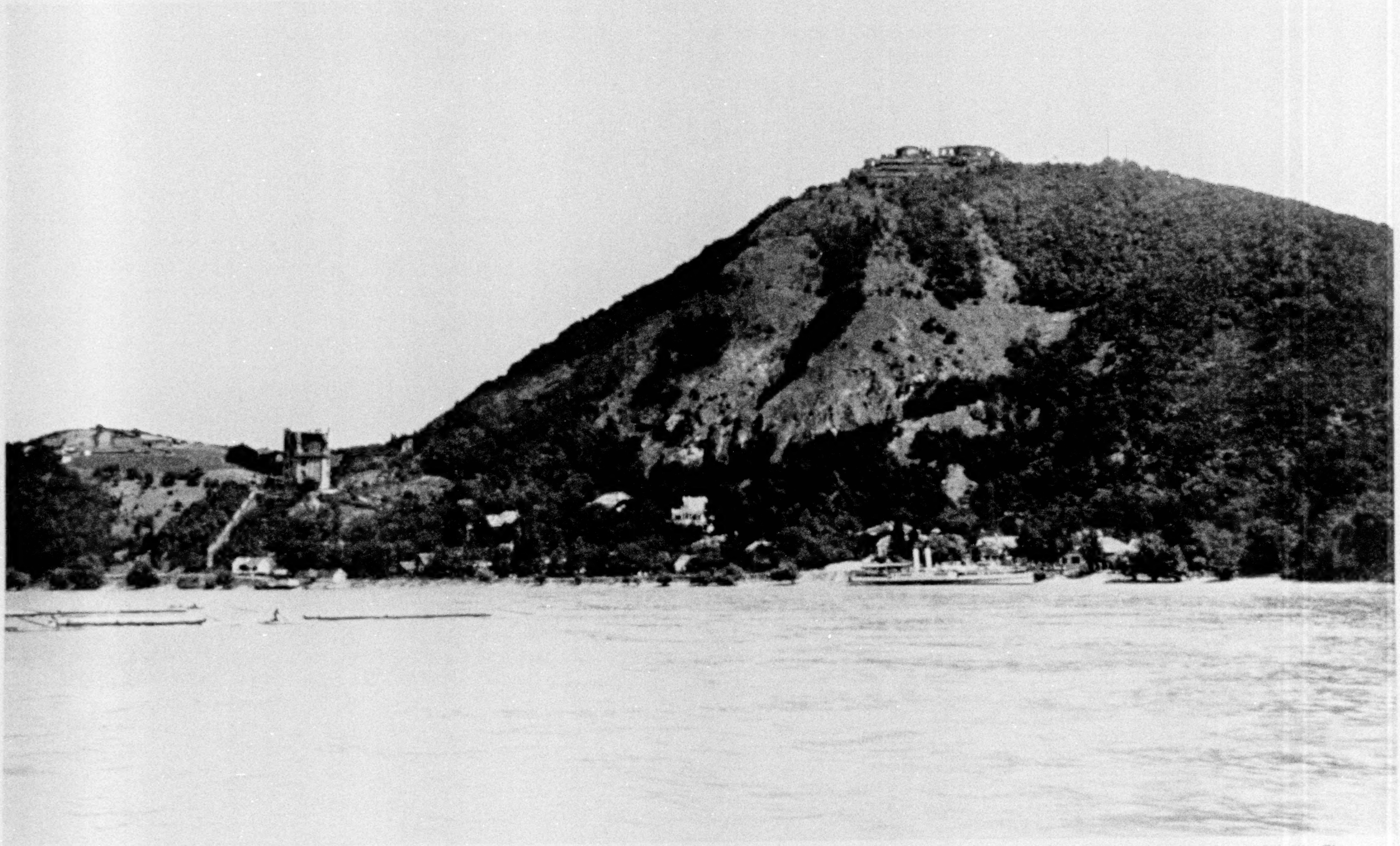
"There are 1,441 rooms and 139 kitchens in the palace and outbuildings," drones the guide, as your visiting group follows him through increasingly sumptuous suites. "The decorations in this room alone cost Maria Theresa $100,000."

"I'd hate to take that girl out shopping," remarks a weary voice. "Doc, couldn't you cut out about 1,400 of those rooms? I generally figure on twenty minutes for a palace."

Napoleon was the last great conqueror to appear on the Danube. In his descent upon the retreating Austrians, he struck at Ulm, Austerlitz, and elsewhere, winning glory and capturing sufficient cannon to melt down into the Vendôme Column.

The Schönbrunn not only saw the conqueror in residence, but later on was thrown into hysteria by the shade of Napoleon *redivivus;* for in 1815, while the Congress of Vienna was availing itself of his banishment to put the much-battered European map to rights, and overjoyed royalties were holding an endless round of champagne parties, a thunderbolt descended on the palace. The Devil (Napoleon) had escaped from Hell (Elba)! Map-makers and revelers scattered like that famous belling-the-cat conference when its mice delegates beheld a feline shadow on the window blind!

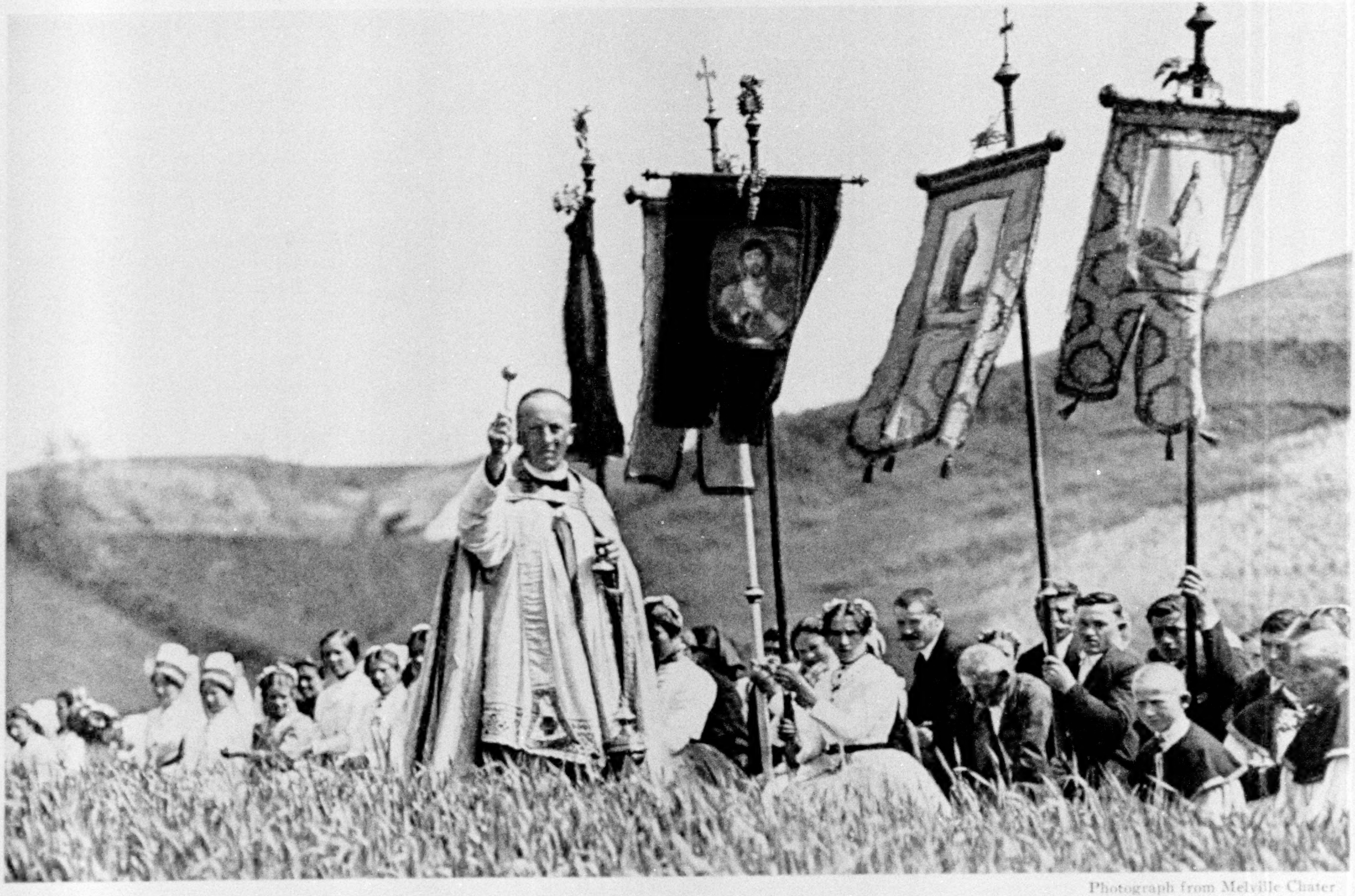
Though thrones may totter, Vienna's cafés go on forever. Incidentally, one



Photograph from Melville Chater

VISEGRAD IS PROUDLY POISED ON A ROCKY HEIGHT BY THE DANUBE

Centuries ago this castle, which is situated north of Budapest, was the seat of the summer court of the kings of Hungary, and the full flower of chivalry bloomed here. Young men of noble birth flocked to it from many foreign lands. Later came the devastating armies of the East to batter the walls of Visegrad, and the forces of Western civilization gathered to stem the onrushing Moslem tide.



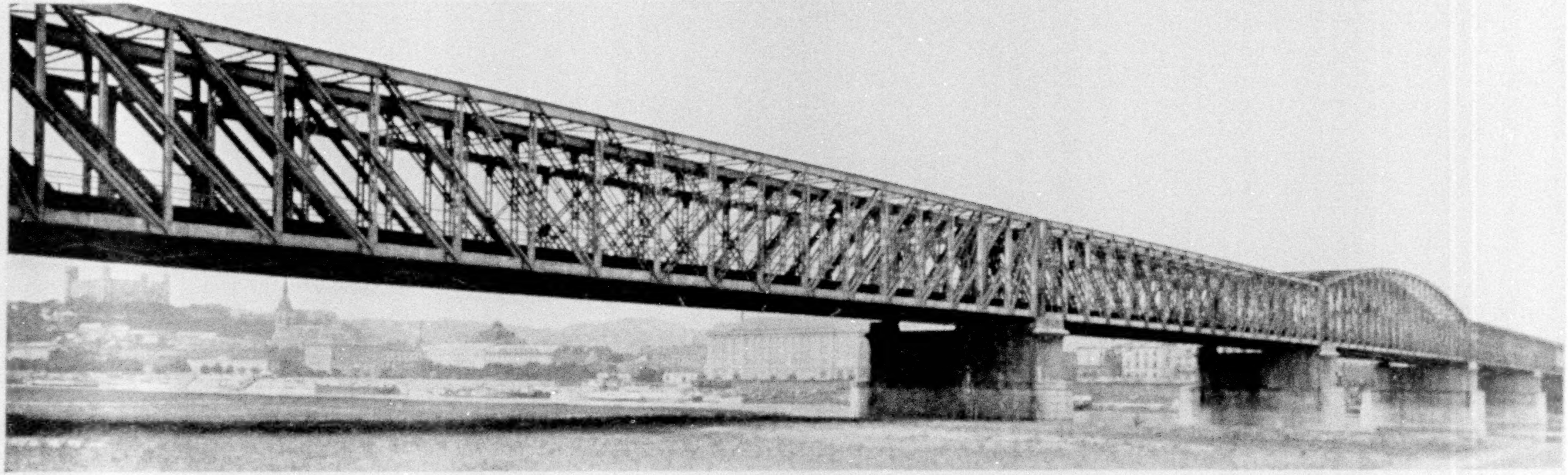
Photograph from Melville Chater

BLESSING THE CROPS IS AN ANNUAL CEREMONY IN MANY PARTS OF HUNGARY

Religion plays an important rôle in the life of the peasantry. Early in the summer processions are formed in the villages, and with flying banners and led by priests, the entire populace goes out into the fields, where the growing crops are blessed.

Photograph from Melville Chater

HORSE-BREEDING IS AN IMPORTANT INDUSTRY ON THE HORTOBAGY PLAIN EAST OF BUDAPEST (SEE, ALSO, ILLUSTRATION, PAGE 663)



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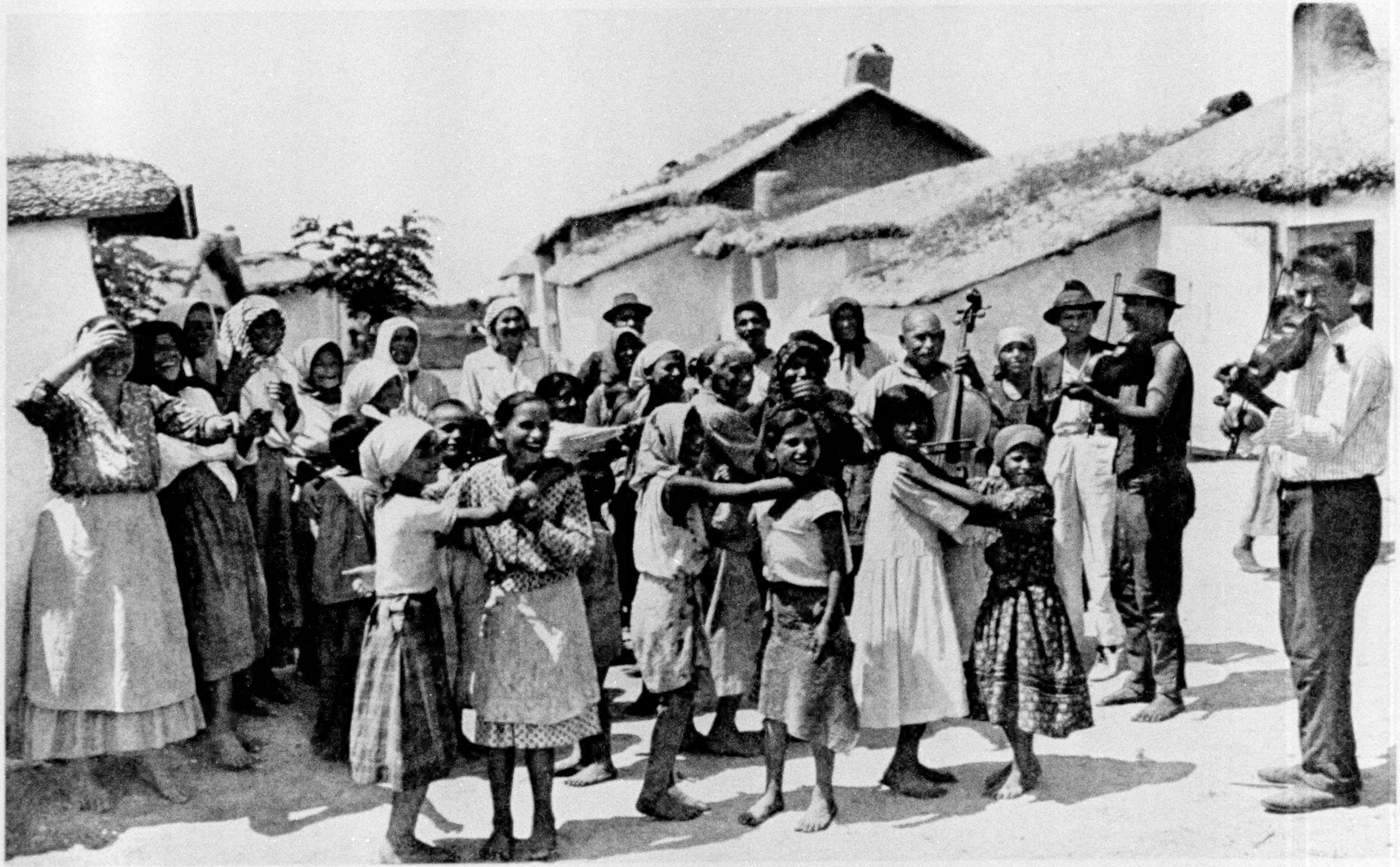
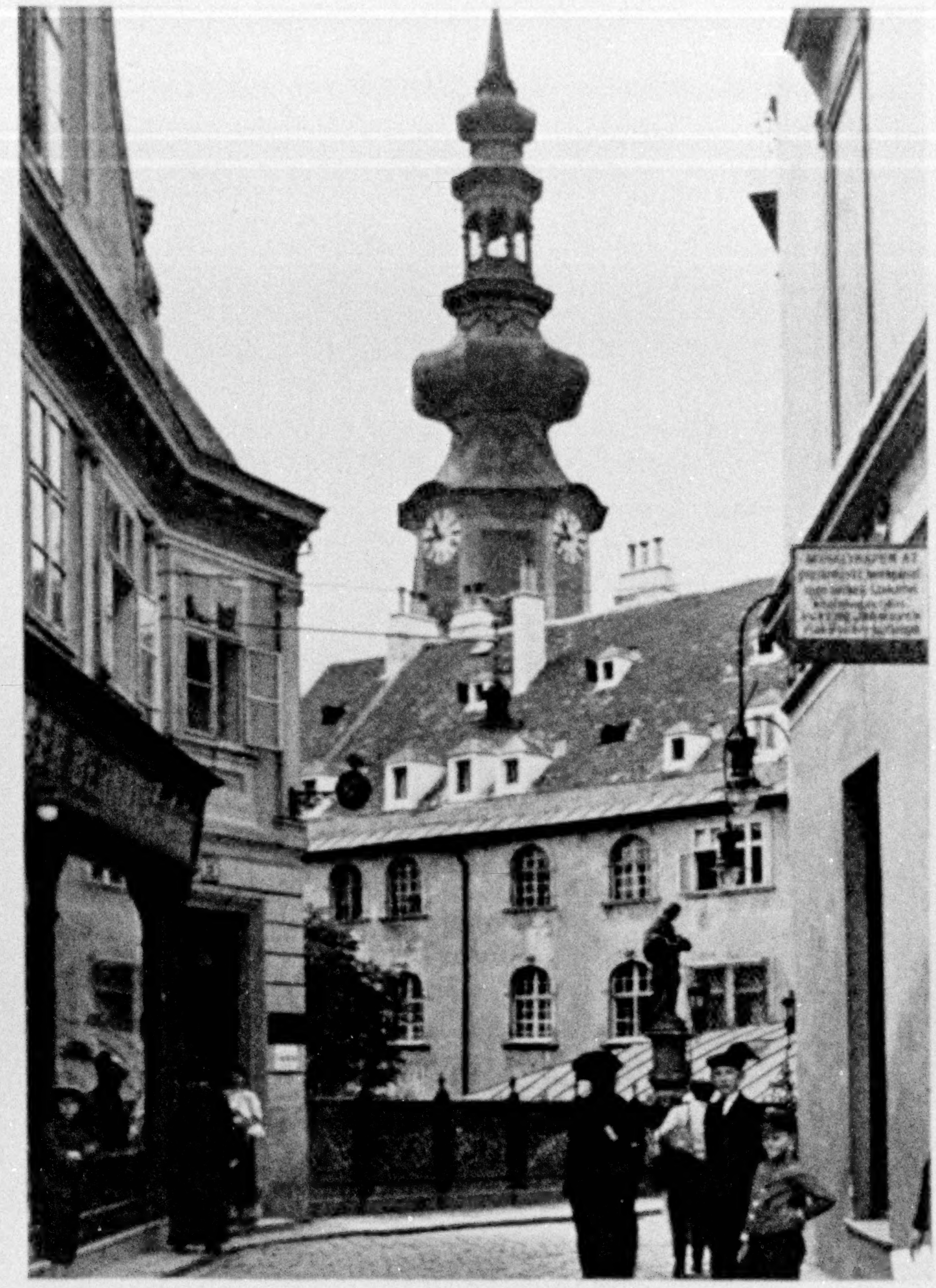
STONE PIERS AND IRON BEAMS HAVE SUPPLANTED THE BRIDGE OF BOATS WHICH LONG SPANNED THE DANUBE AT BRATISLAVA



Photograph by Ewing Galloway

GYPSY CHILDREN MAKE MERRY ON A HOLIDAY

Although known the world over as nomads, there are gypsies in many parts of central and eastern Europe who live in more or less permanent villages. The folk dances of the children and the accompanying tunes have been handed down from generation to generation. This music is the basis for many of the airs that have made Hungarian composers famous (see, also, text, page 661).



IN OTHER DAYS BRATISLAVA WAS A ROYAL CITY

For centuries the kings of Hungary were crowned at Pozsony, as this ancient community was known before territorial readjustments after the World War made it a part of the new Czechoslovak Republic (see text, page 668).

frequents those haunts of social sobriety to sip coffee, quaff beer, or consume snacks; but in reality one is there to read newspapers, play cards, write letters, or interchange language lessons. Though you sit unspending all afternoon, endless glasses of water relay themselves on your table. Is time money and space precious? Seemingly not to Vienna's beaming café proprietor.

There are 1,100 such resorts in the city, and apparently every Viennese is addicted to one particular café at one particular hour. If an habitué is ten minutes late, it's a safe bet that he has been run over by a motor car. You may frequent at choice the business man's café, the professional man's café, the bohemian's café, and — not the least interesting — the revolutionaries' café. Over the last named little tables lean long-haired, slouch-hatted villains of melodrama, plotting the downfall of almost any European State. It's a case of "Hist, comrades! At the signal, capitalist-ridden Ruritania falls into our hands! Ha! Ha!"

HOME OF MUSIC AND MUSICIANS

Skimming over the list of Vienna's good things that have carried her name abroad, one might mention Vienna rolls, Vienna beer, Vienna sausage, Vienna schnitzel, and Vienna light opera. The last-named is but one aspect of a musical tradition harking back to the Minnesingers' days, when Walther von der Vogelweide sang at Vienna's court.

Historically, Vienna has always been the great adoptress of composers—Gluck, Mozart, Haydn, Beethoven, Brahms—who settled among her music-loving people.

Two of her native composer-sons are world property. Page that doubtful corner of the earth where the undulating measure of "The Blue Danube," instinct with ghosts of waltzers twirling toplike, has never been heard! What if the Danube is, in fact, mud-colored, with light-greenish hues at low water? To anyone who has ever loved that waltz, the Danube will remain forever blue. How many millions of feet have moved to its rhythm since composer-bandmaster Johann Strauss first played it at the Vienna Carnival of 1826!

No such easy fame befell Franz Schubert. Leading a hand-to-mouth existence, he produced in his short lifetime compositions enough to furnish half a dozen reputations. In his eighteenth year alone he created 25 major pieces and 146 songs. He composed so spontaneously that music seemed to leap fully born from his brain; yet after his death his estate was found to consist of manuscripts whose probate value was less than three dollars!

Vienna, during our visit, was decked forth for his centenary. "Schubert schillings" had been struck to honor the man who was so often penniless. Silent multitudes stood massed in public squares to hear his music. "From the heart it came, to the heart it shall go," spells the universal appeal of that simple-souled genius, melodist of joy and sorrow.

And one musn't forget Vienna's beloved, if apocryphal, "lieber Augustin," that little folk-singer of the battered hat, ragged clothes, outturned pockets and bagpipe. One night in 1679 Augustin, drunk as usual, fell into a plague pit. Reviving next morning, he sat up among the corpses and caroled forth, "Money's gone, sweetheart's gone, Augustin's in the dirt," setting it to the infectious lilt that was to invade the world's yet-unborn kindergartens. And whoso doubts this tale of optimism triumphant may visit Vienna, where, on a street corner, Augustin's little statue pipes to passers-by, *"Ei, du lieber Augustin, alles ist hin!"*

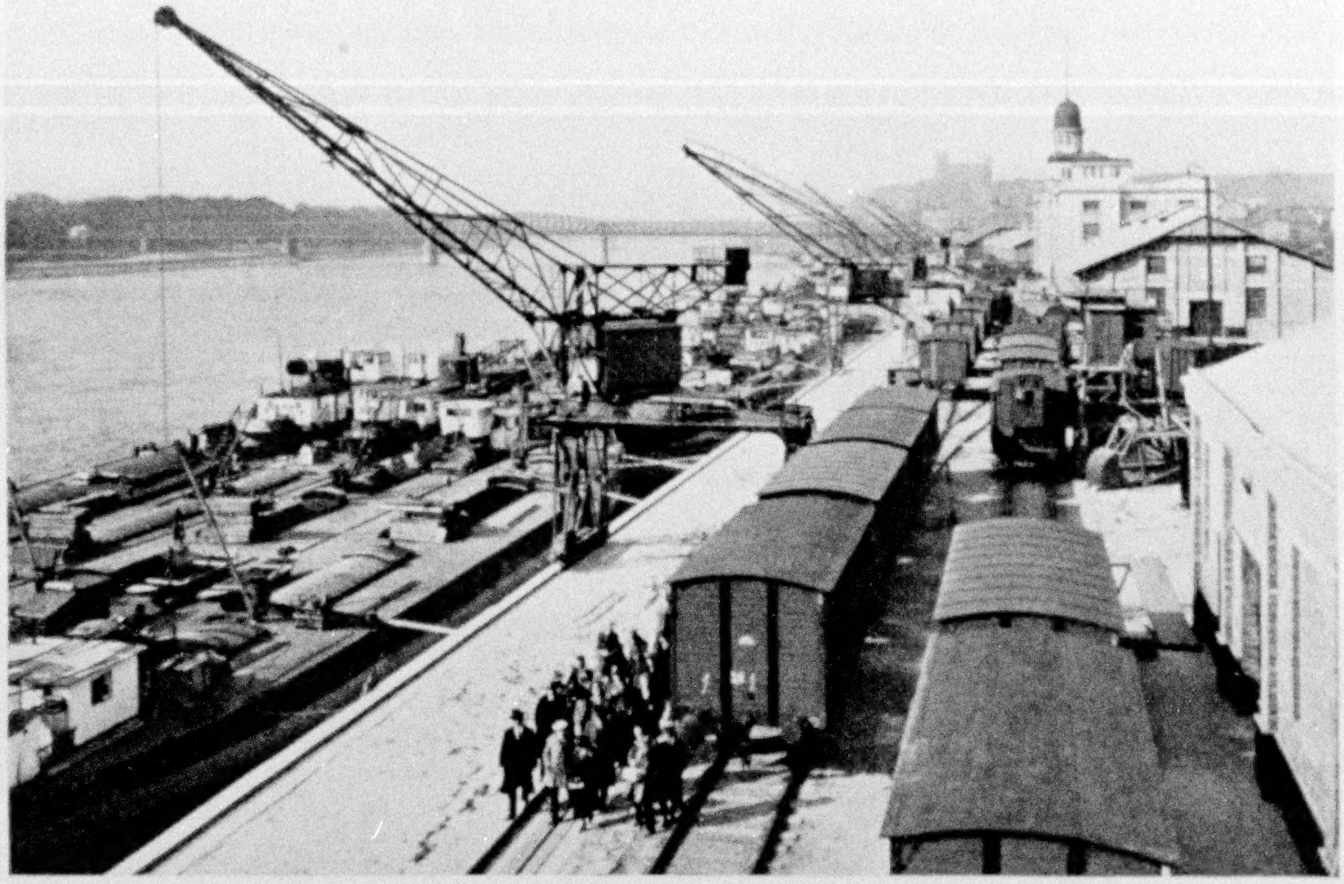
Photograph by Bayer

AGGSTEIN WAS LONG A DREADED NAME ON THE DANUBE

None of the robber strongholds which dotted the heights along the river in medieval days had a more fearsome reputation than that occupied by the lords of Aggstein. From their impregnable perch they laid heavy tribute on passing cargoes and defied all efforts to dislodge them.

BIG BUSINESS FOR DANUBE CASTLES DURING THE CRUSADES

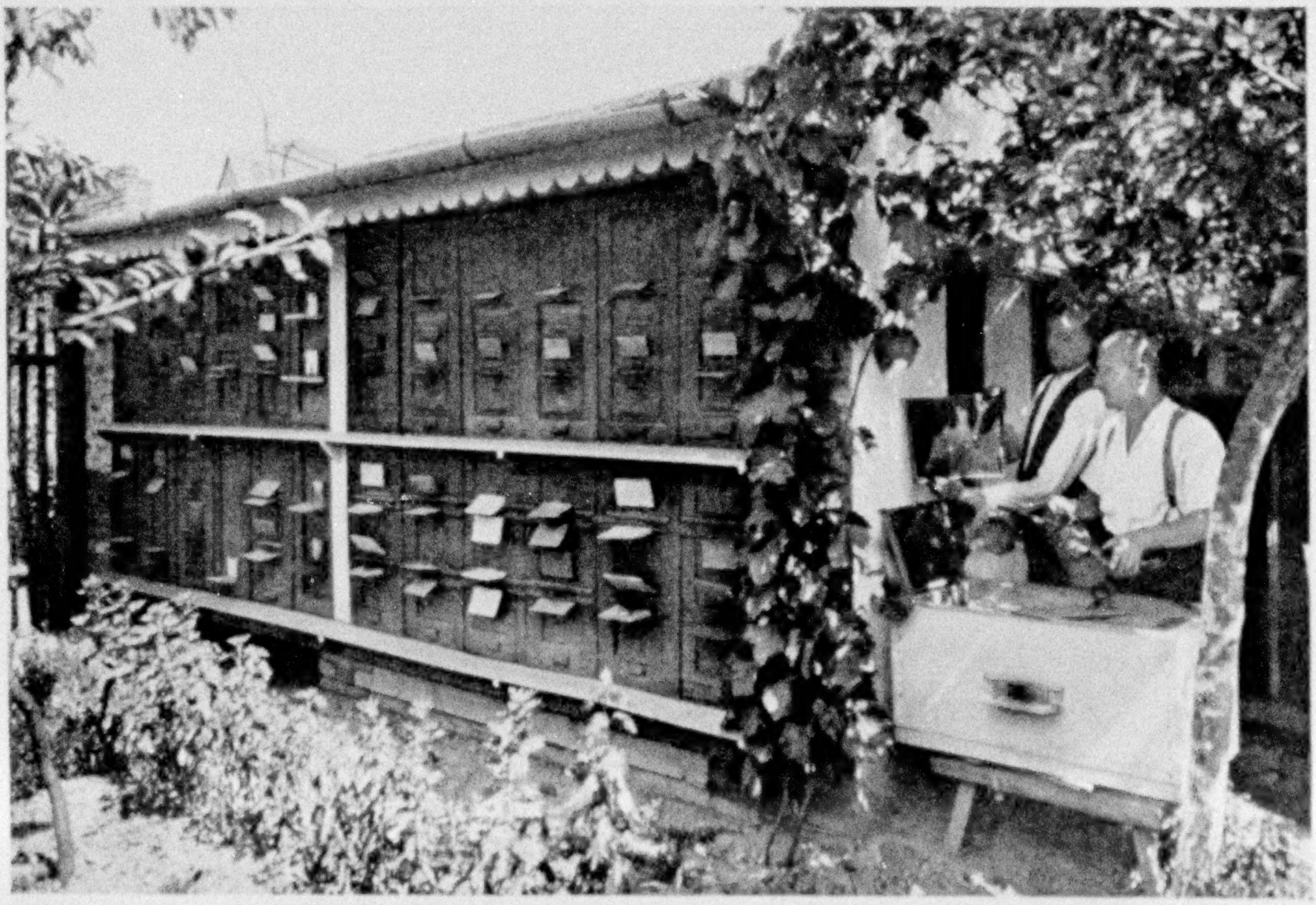
Once more aboard the *Patria,* with Greifenstein's fine old castle rising into view, we asked the skipper if we weren't nearing the Danube's region of medieval strongholds. He assented, adding that he wondered why Americans liked old ruins. But skyscrapers, now! . . . Enthusiastically he depicted the skyscraper as the



Photograph from Melville Chater

WHERE RAIL AND RIVER TRAFFIC MEET

Since the World War Bratislava (Pressburg) has developed into Czechoslovakia's principal port on the Danube (see, also, illustration, page 680).



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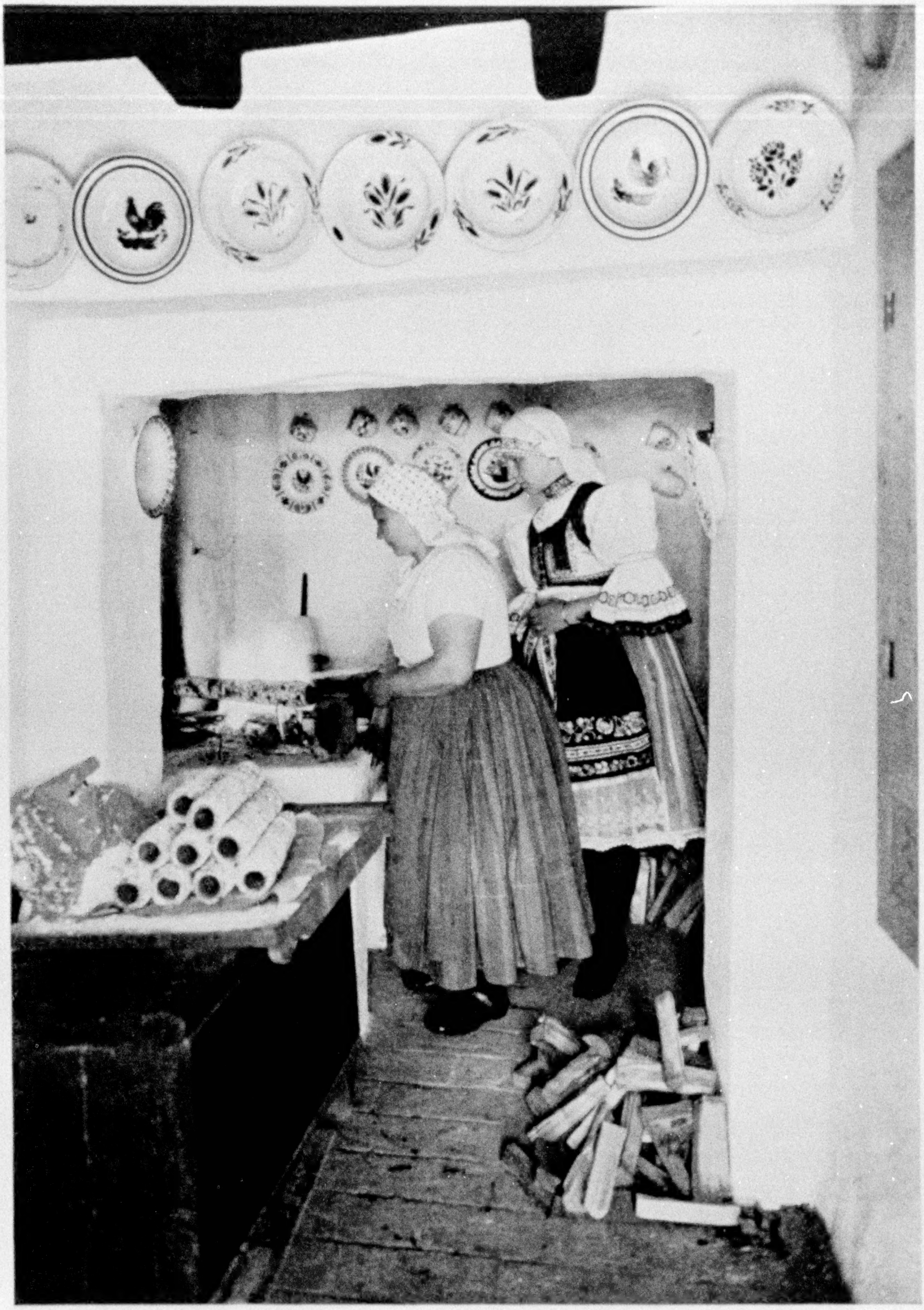
HERODOTUS WROTE OF THE HONEY RESOURCES OF THE DANUBE

The air hums with the music of bees at work gathering honey from broad acres of buckwheat blossoms in the vicinity of this apiary in southern Czechoslovakia, but Herodotus may be said to have exaggerated somewhat when, in a report written 24 centuries ago, he declared that vast bee armies made certain Danube regions uninhabitable (see page 647).



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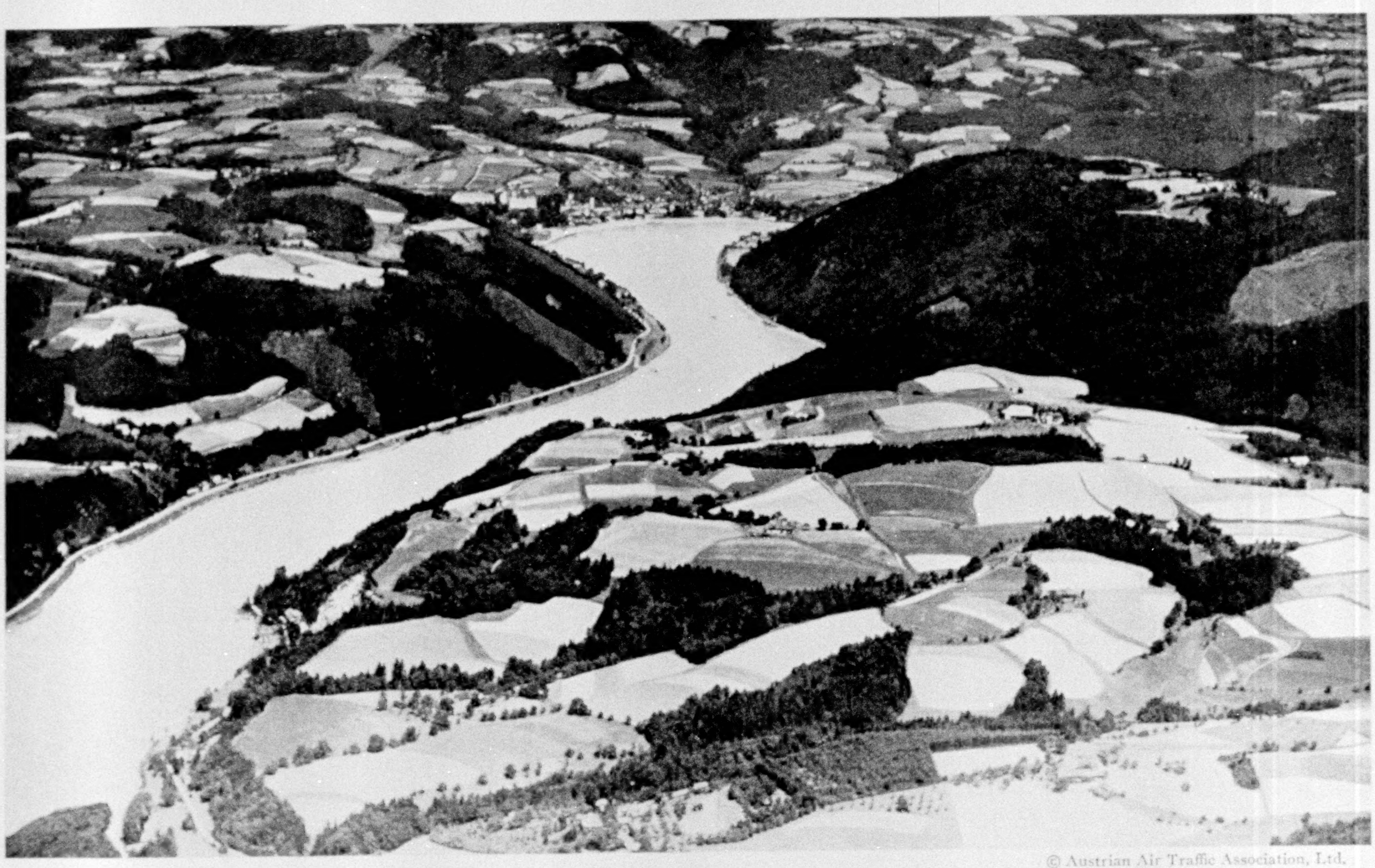
CAKE-MAKING IN A CZECHOSLOVAK PEASANT KITCHEN

In villages of central Europe the kitchen frequently serves as a general living room, a dining room, and perhaps as a place to sleep, in addition to its normal functions. The cakes made by these women are baked on rollers over an open fire. Some of the finished products are on the table in the foreground.



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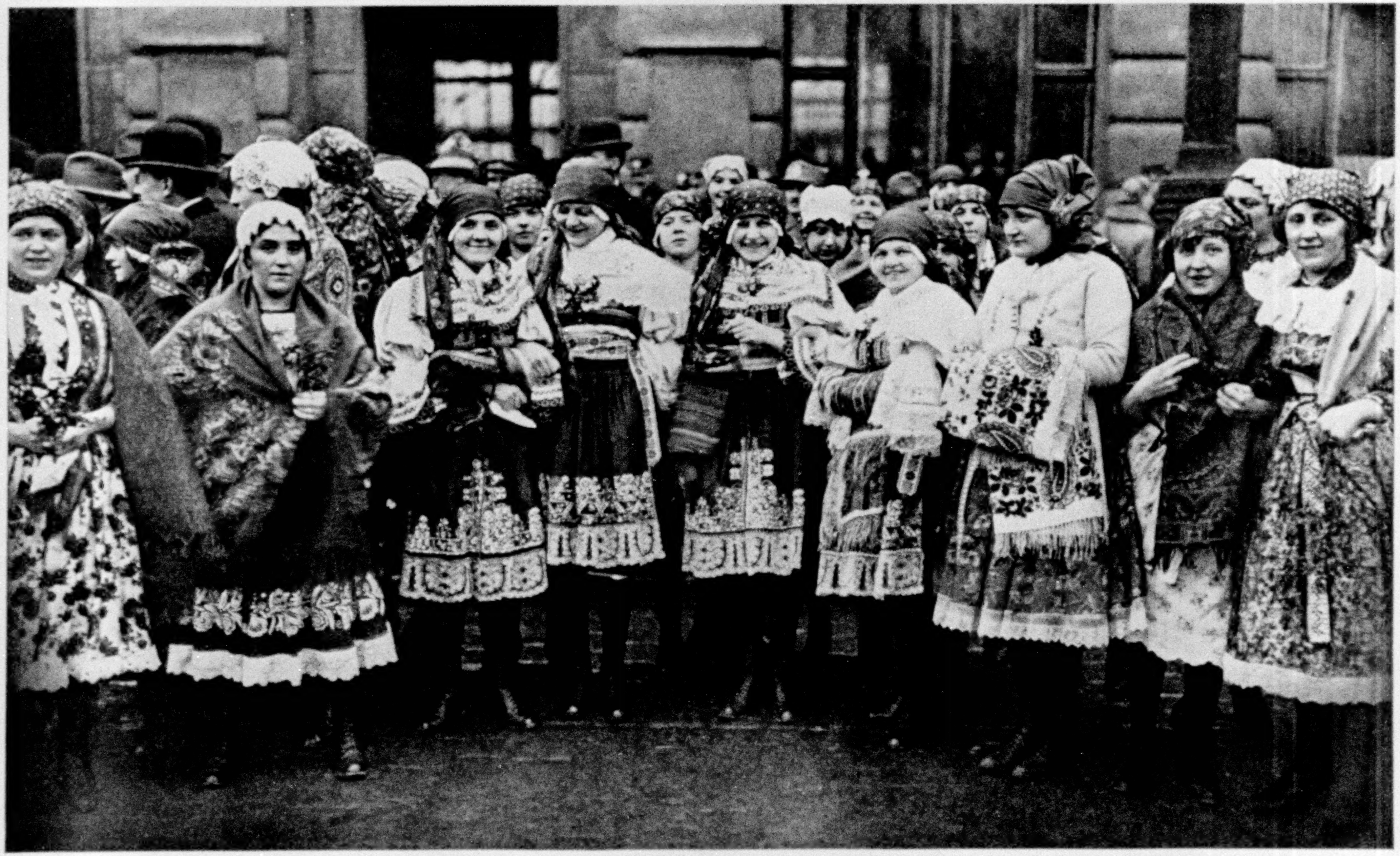
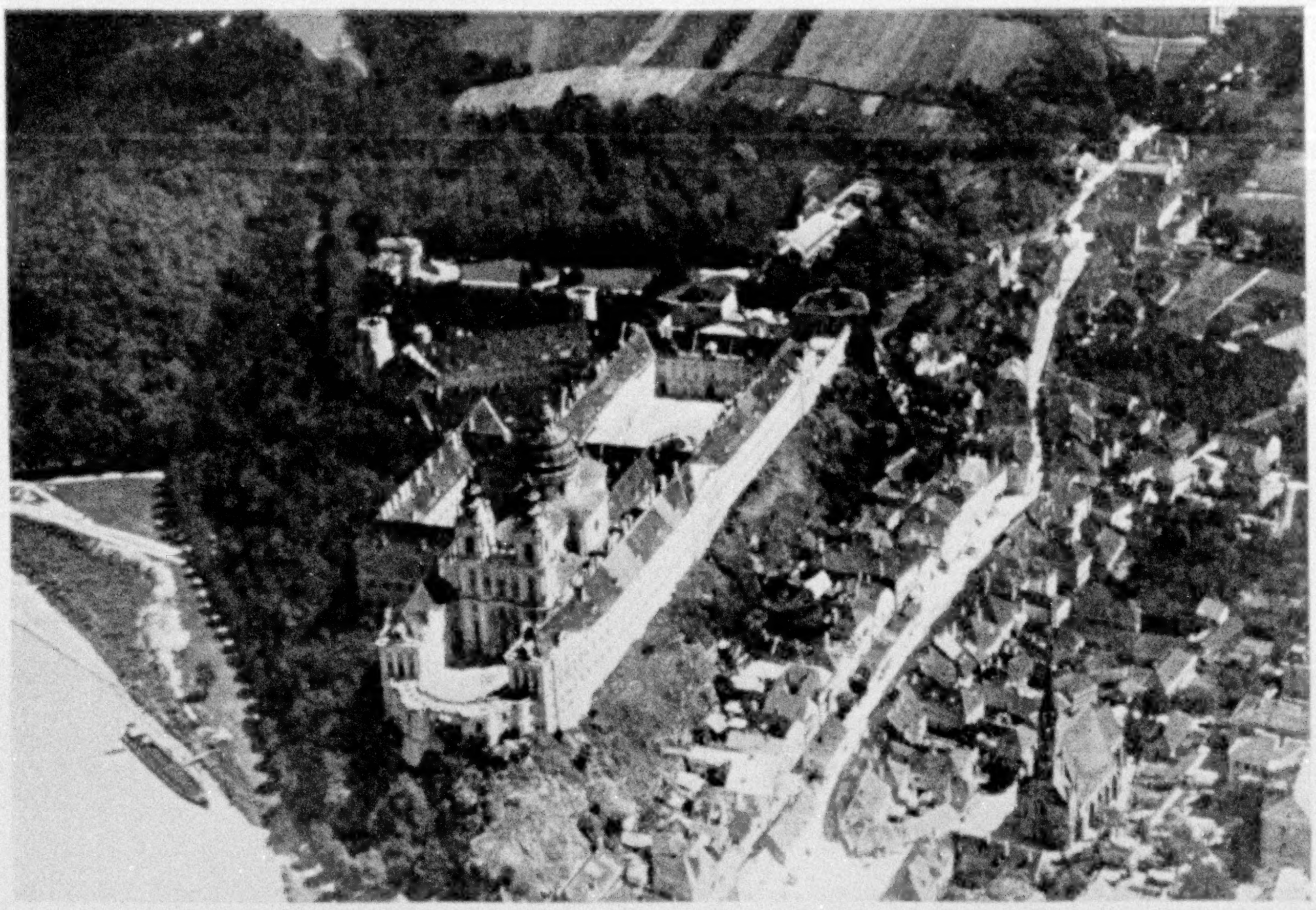
NEAR THE AUSTRIAN TOWN OF GREIN THE DANUBE WINDS THROUGH ALTERNATING STRETCHES OF WOODED HILLS AND ROLLING CULTIVATED FIELDS

Austria, for many years an industrial nation, has found it necessary since the World War to give more attention to agricultural pursuits. That her people are succeeding in this new line of endeavor is indicated by the remarkable increases in her crop yields in the past decade, many of them totaling more than 100 per cent.



ON HOLIDAYS CZECHOSLOVAKIAN GIRLS DISPLAY THE BRILLIANT COSTUMES OF THE PAST

Commercial and industrial contacts with the western European world have caused a decline in the use of the colorful national costumes. They still appear, however, on occasion and are more often seen in conservative Slovakia than in Bohemia.



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MELK'S MAGNIFICENT MONASTERY IS ONE OF THE GLORIES OF THE DANUBE

Erected in the early 18th century, on the site of an older establishment, this Benedictine foundation in Austria is a noble example of ecclesiastical Roman architecture. It commands a rare view of the river and of the wooded heights beyond.

American castle of industry. He said he'd like to see every defunct Danube castle replaced by a 50-story business edifice.

But why not regard the Danube castle as having been in its day the busy skyscraper of medievalism? Steaming past the Wachau Defile's crag-set ruins, we reflected upon the formidable amount of trade that fell to them as a result of the Crusades.

In 1096 some 2,000 craft, packed with 40,000 Palestine-bound troops, descended the Danube. Three ensuing Crusades took the same route. There sprang up a river trade consisting of westbound silks, bronzes, spices, oils, and of eastbound furs, arms, and saddlery. And the Danube castles took their river tolls and the flotsam-jetsam rake-off of stranded cargoes, not to mention piratical seizures and the enslaving of ships' crews.

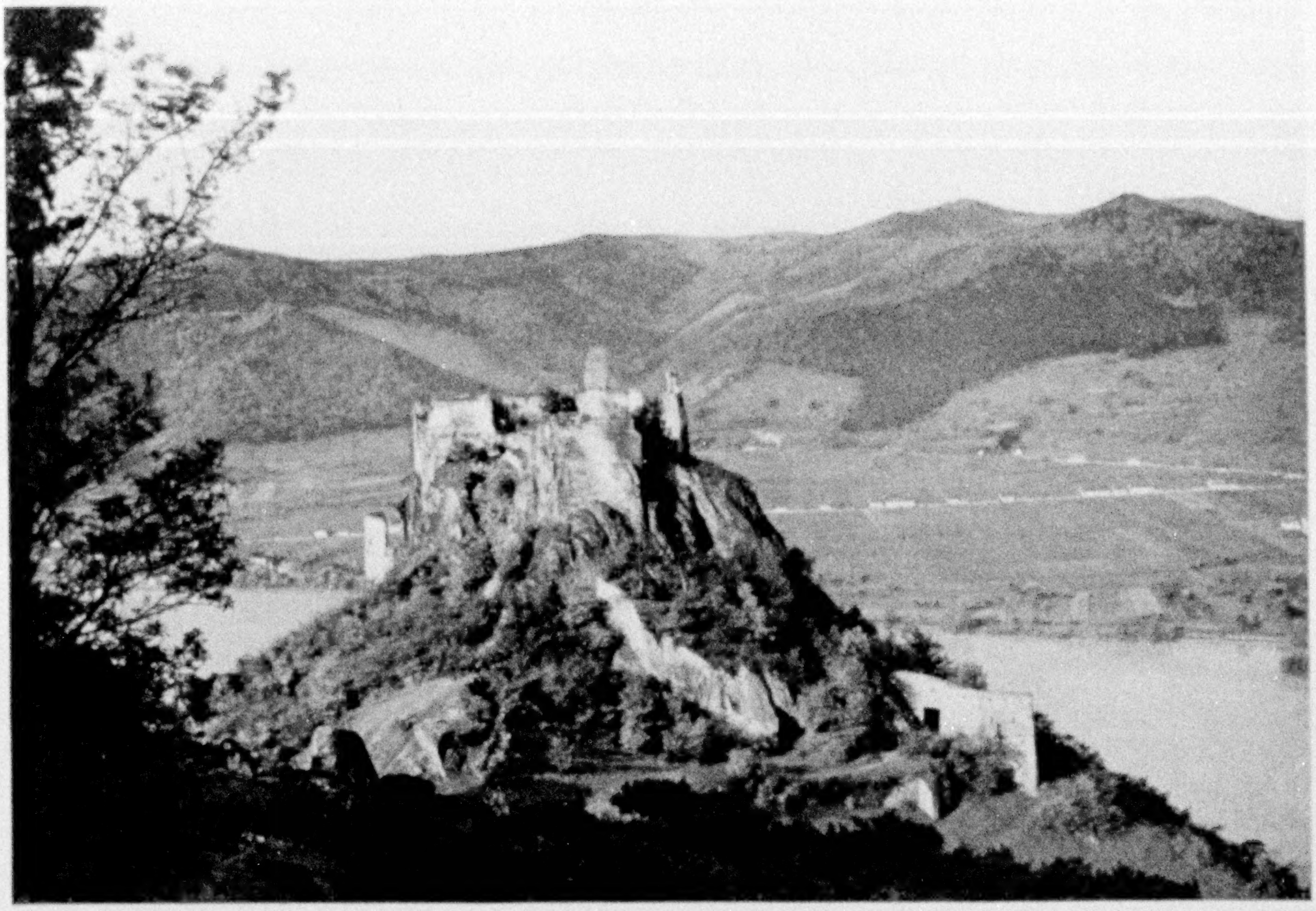
Castle Aggstein, the most dreaded of Danubian robber strongholds, must have had a big turnover in riparian loot and captive maidens. And Castle Dürnstein eclipsed all local records in the capture-and-ransom trade when its gates closed upon that royal prize, Richard Cœur de Lion (see pages 683 and 689).

Yes, the more we studied the Wachau's crag-set castle ruins, reflecting on their crime-soggy past, the more we relished the captain's fancy of replacing them with American skyscrapers. What a meting out of poetic justice it would be to transform bloody Aggstein into, say, the Aggstein Life Insurance Building, and untrustworthy Dürnstein into the Dürnstein Loan and Trust Company!

A "GHOST" IN RICHARD THE LION-HEART'S CASTLE

Dürnstein proved to be a quaint little town, tucked behind medieval walls, frowned upon by a ruin-crested rock, and enlivened by many a cosy "Gasthof Richard" and "Bierhaus Blondel."

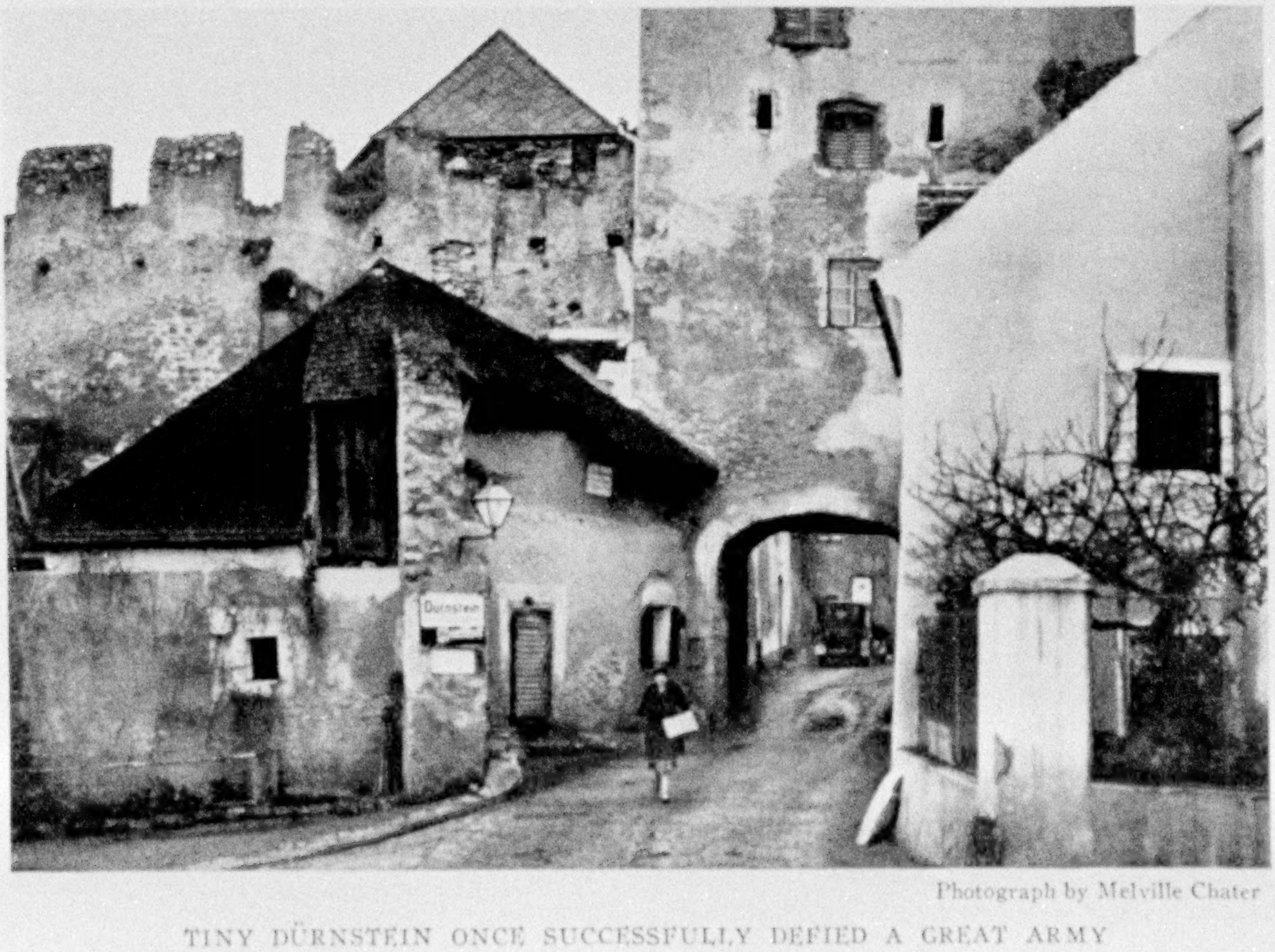
Recalling the old tale of Richard's secret prison and of his faithful minstrel's singing quest from castle to castle, we asked our host at the Café Lion-Heart if he couldn't produce Blondel's original



Photograph by Osterreichische Lichtbildstelle

MEMORIES OF CŒUR DE LION CLING TO THE TOWERS OF DÜRNSTEIN

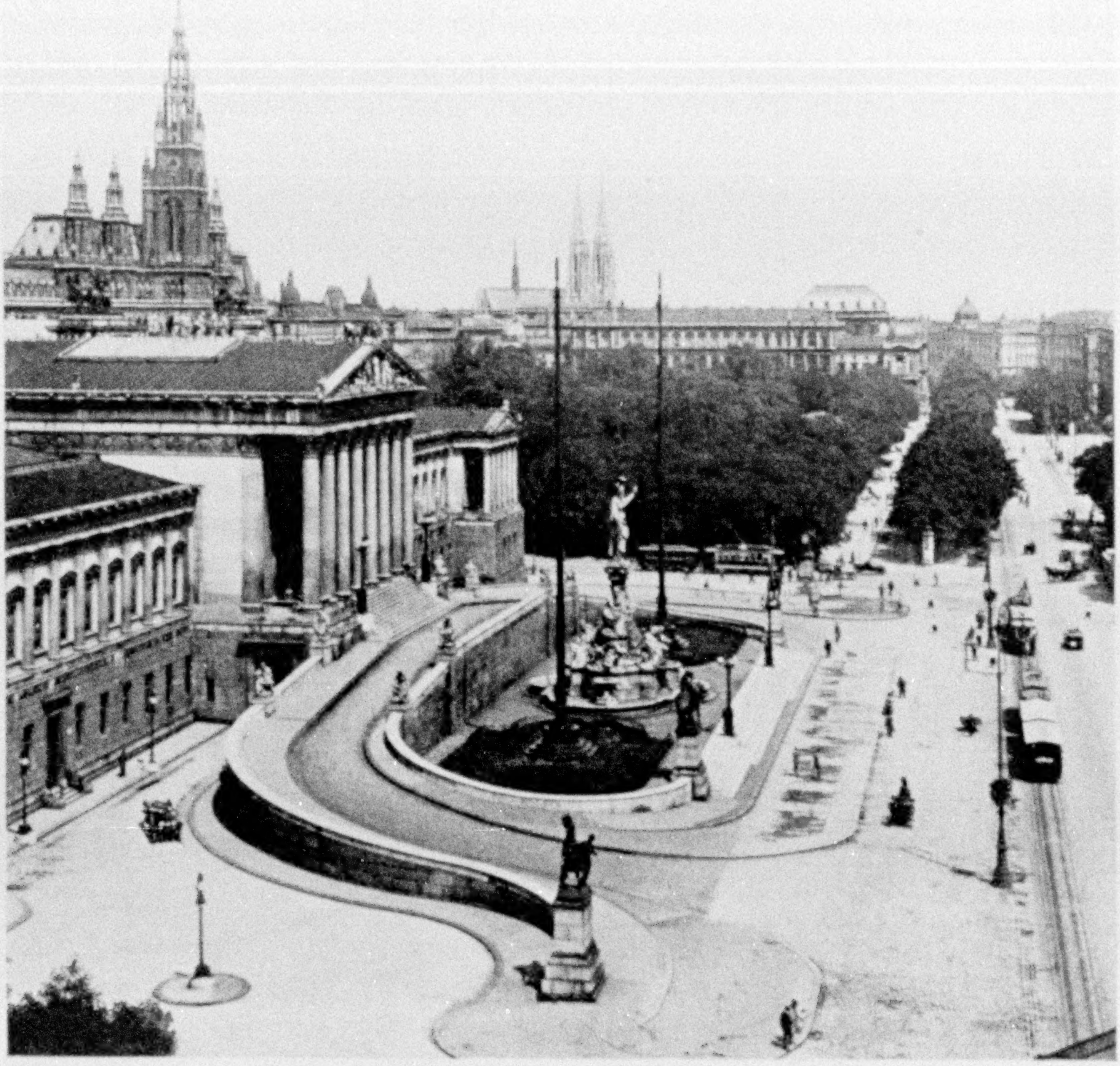
Here Richard I of England languished a prisoner for more than a year after his capture by Duke Leopold VI, following the Third Crusade (see text, opposite page).



Photograph by Melville Chater

TINY DÜRNSTEIN ONCE SUCCESSFULLY DEFIED A GREAT ARMY

During the War of the Austrian Succession, Maria Theresa's enemies, marching on Vienna, appeared before the walls of Dürnstein. There were no soldiers inside, but the stout-hearted citizens blackened logs and drain pipes to look like cannon and placed them in the embrasures. They convinced the invaders that the place was too strongly held to be attacked.



Photograph by Postkarten-Industrie A. G.

VIENNA'S RING-STRASSE IS A NOBLE BOULEVARD

The building in the left foreground is the House of Parliament, with the Pallas-Athena Fountain in front. In the distance to the left rises the tower of the City Hall. In the background the University of Vienna and the twin spires of the Votive Church are visible beyond the mass of foliage (see, also, text, page 677).

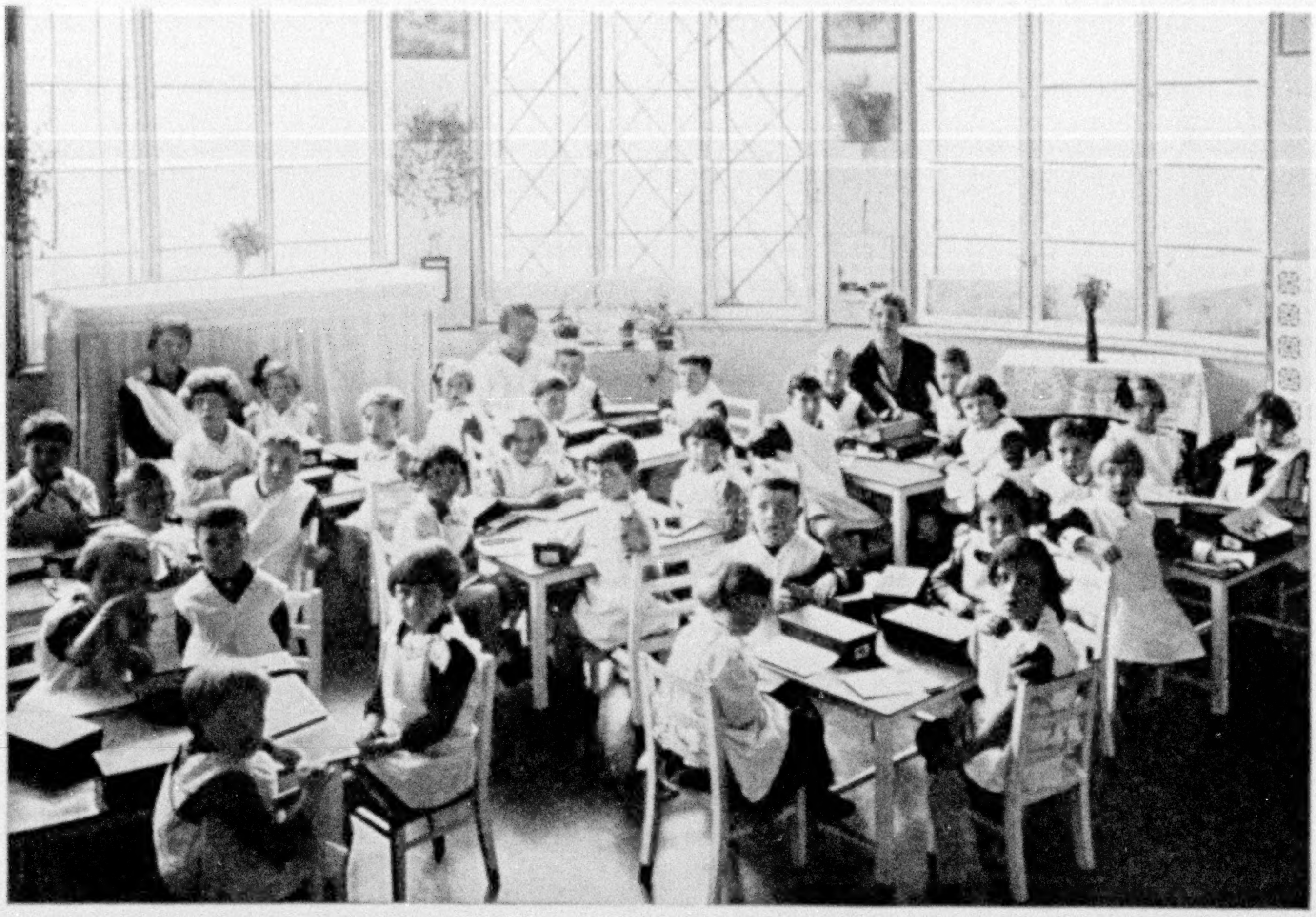
harp; but he said he would blush to stoop to such practices. He did, however, invite our attention to an old-fashioned book. It gave the Provençal words of the Blondel-Richard duet, adding, "And still at moonlight, it is said, the shepherd passing Dürnstein's hoary tower hears mysterious harp strains mingled with two ghostly voices, which bear the chanson that Richard and Blondel exchanged on this spot ages ago."

We took our host's advice and visited the adjacent castle at moonrise. As we neared the silver-bathed ruins, there floated from somewhere the strains of a tenor voice:

> Donna, vos beautas
> Elas bellas faissos. . . .

Ghosts of the troubadours! It was 12th-century French; it was Blondel's chanson! ("Lady beautiful, yet cold as air, exciting to passion, yet shunning me, I wait in patience.") Then, after some harplike tinklings, a basso voice responded:

> Si bel trop affansia
> Ta, de vos, non partrai. . . .



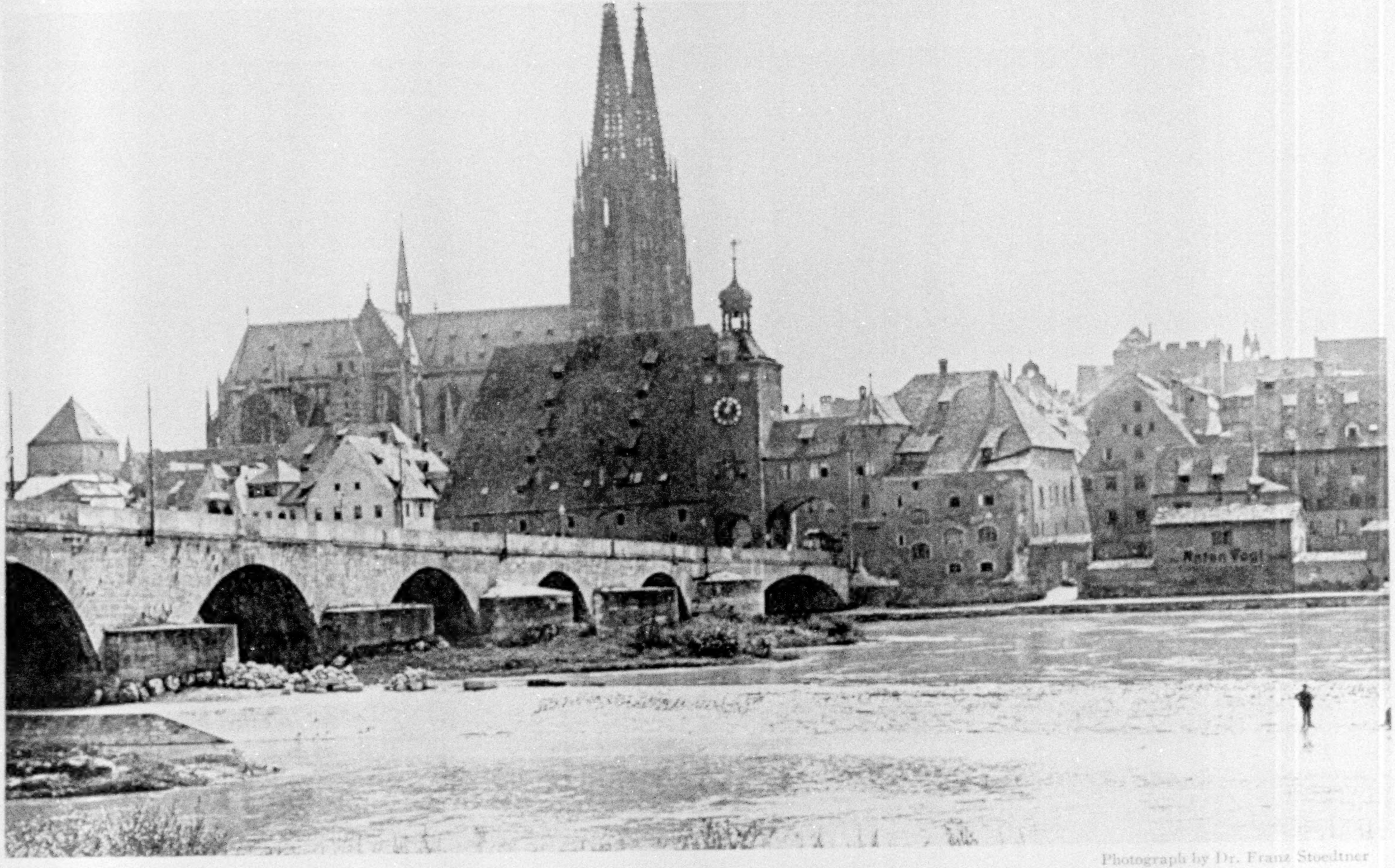
THEIR MOTHERS HAVE TO WORK AWAY FROM HOME

Kindergartens for these Viennese children are maintained by the city, often in the apartment building where they live.

Photograph by Postkarten-Industrie A. G.

VIENNA IS PROUD OF ITS FINE APARTMENTS FOR WORKINGMEN

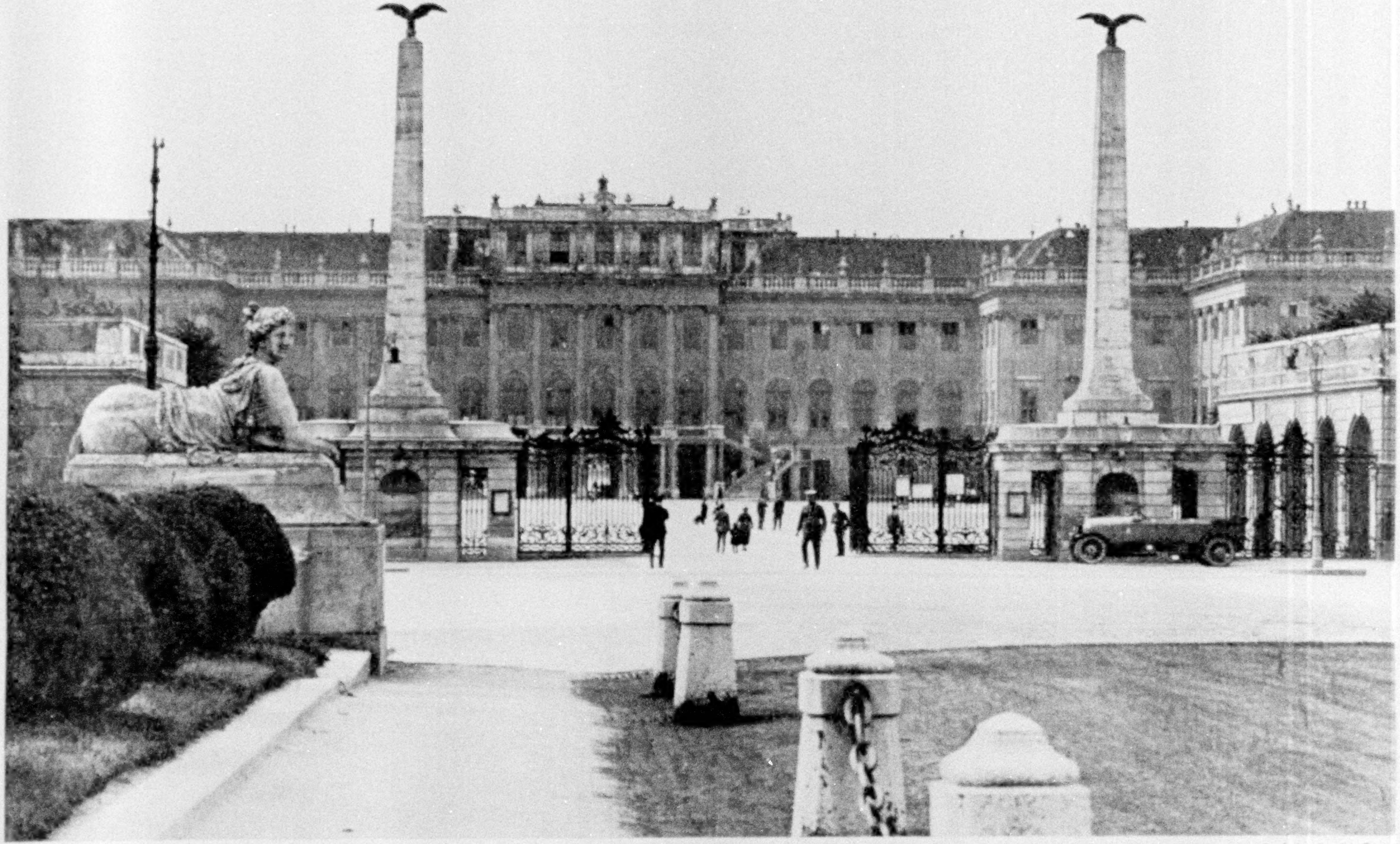
The municipality has built a number of these buildings, in which pleasant living quarters are provided at very low rentals. In some of them a single central kitchen provides meals for all who wish to avail themselves of its service (see, also, text, page 668).



Photograph by Dr. Franz Stoedtner

FROM A MEDLEY OF MEDIEVAL ROOFS RISE THE DELICATE TWIN SPIRES OF REGENSBURG'S CATHEDRAL

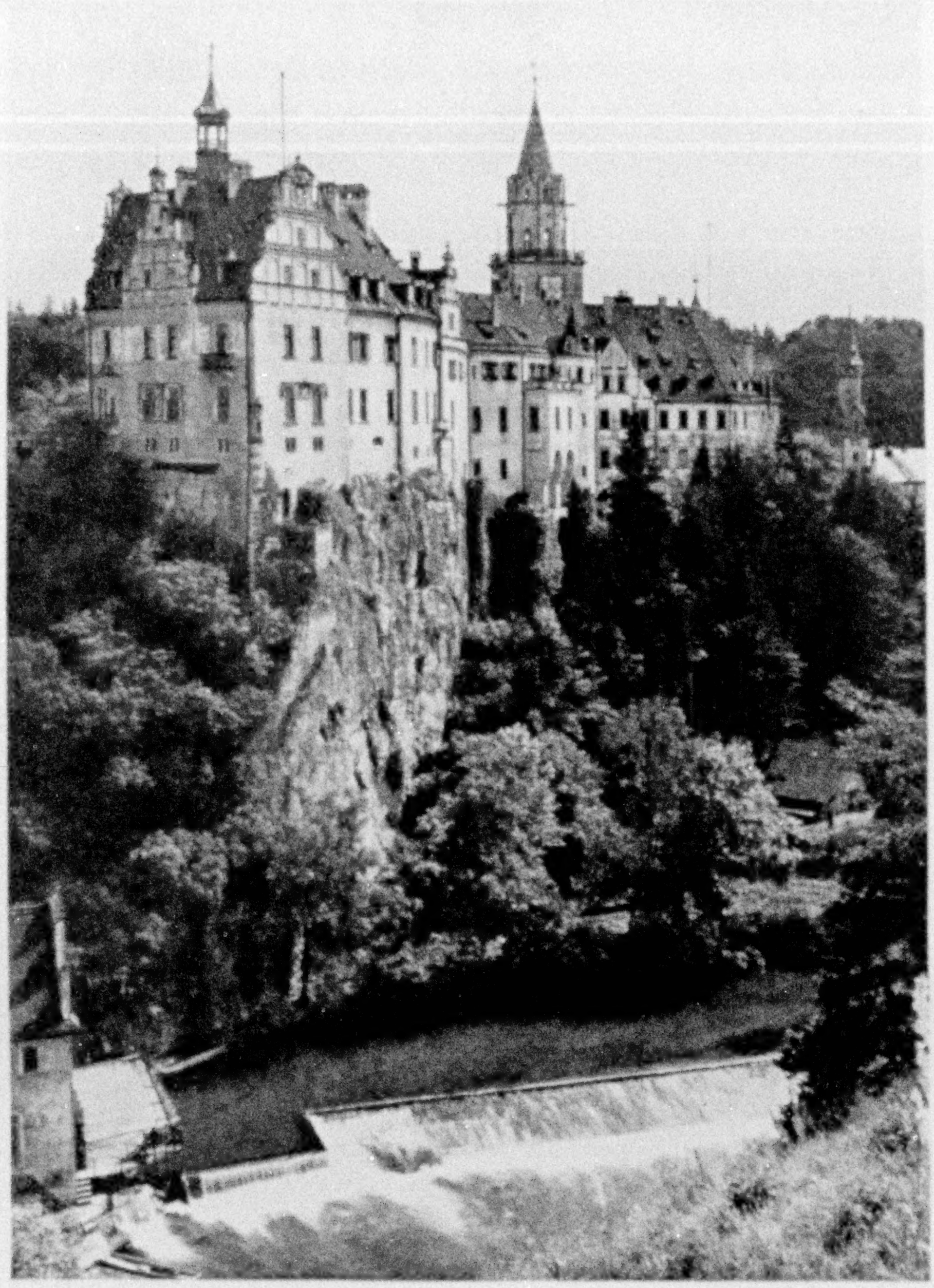
The city claims a lineage that goes back to 179 of the Christian Era, when Marcus Aurelius founded a Roman camp here. It was an important center of early German art and culture, and its beautiful cathedral, begun in 1275 and not completed for nearly six centuries, is one of the great Gothic churches of Europe.



Photograph by Postkarten-Industrie A. G.

SCHÖNBRUNN PALACE NOW HOUSES A VIENNA ORPHANAGE

This was one of the favorite residences of Emperor Franz Josef, who died here during the World War. Much of the present building, like the Royal Palace at Budapest, was built under direction of the energetic Maria Theresa in the 18th century. Some of the rooms of the palace are maintained in their former splendor as a museum; others are used to house homeless children (see, also, text, page 677).



Photograph by Karl Obert

SCHLOSS SIGMARINGEN IS OF RECENT CONSTRUCTION

The princes of Hohenzollern lived in this pleasant town above Ulm, on the upper reaches of the Danube, and from here they went out to win for themselves imperial honors. The present castle, towering proudly on its steep rock, was rebuilt in 1893.

Again the ancient *langue d'oc,* King Richard's response! ("I take no wound from her who divides her favors. Oh, rather hatred than thus share love with others!")

Yes, it was all very ghostlike and thrilling—that is, it would have been if, upon descending to the Café Lion-Heart, we hadn't caught our host in the act of taking off the chanson phonograph record and putting on that of "Give Your Little Baby Lots of Lovin'!"

For three more days we wound through upper Austria's plains, where lies pleasant Linz, and around curves inclosed between some of the finest of wooded heights on the Danube. Beyond lay Passau, with its barge-crammed port and its 17th-century house gables, extending tonguelike between the joined waters of the Danube and the Inn.

OUT OF AUSTRIA, INTO BAVARIA

That we were out of Austria and in Bavaria became hourly more evident by passing glimpses of towns whose Gothic towers and crow-stepped gables lifted over the stream. But, as we neared Regensburg, a Danube-dominating monument caused us to wonder if we were in a land of things Gothic or things Greek. To plant a Parthenonesque temple on a German hillside and give it the Scandinavian name of "Walhalla" was the florid feat of Ludwig I of Bavaria. No calm-limbed Apollo or ox-eyed Hera presides therein, but instead six titanic Valkyries, who loom above the busts of Teutonic kings, statesmen, generals, scientists, poets, which line this extraordinary Hall of Fame (see page 697).

But why wrench architecture from its native landscape? The flash of marble columns by Ægean seas is one beauty. The shadowy genius of Gothicism, brooding under its northern skies, is another. Of the latter beauty is Regensburg, an etchinglike town of 13th-century gateways, of oriel windows opening on cobbled courts, of stone friezes whose figures, in kingly panoply or knightly mail, look down at you from church façades.

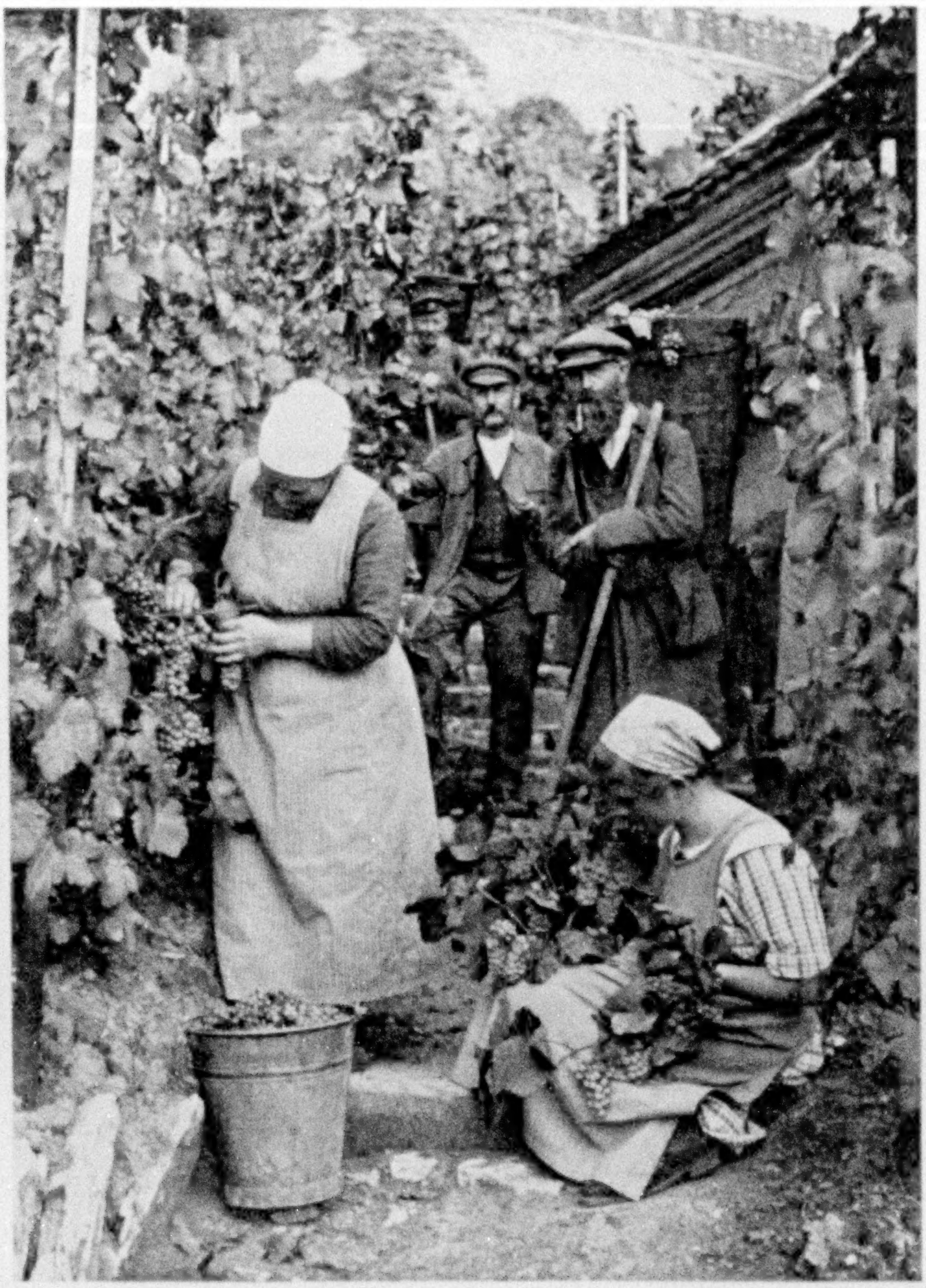
REGENSBURG'S FAMOUS BRIDGE HAS SEEN A MARVELOUS PAGEANT

Even as Nuremberg is a living picture of the 16th century, so Regensburg is a picture of the yet earlier Gothic and Romanesque periods. Here are tall defense towers, eloquent of an age of all-powerful nobles. Here are dim tapestries and priceless hoards of goldsmith's work, equally eloquent of the days when Bavarian guildsmen aspired to art perfection as a form of piety.

Here also are monkish manuscripts breathing of a time when medieval man everywhere sensed the devil's machinations. Thus Regensburg's cathedral contains the soul-admonishing statue group of the devil and his grandmother, and Regensburg's bridge couldn't possibly be completed until the devil had been promised the souls of the first three beings who crossed it. However, the wily architect dodged this pact by sending across the bridge a dog, a cock, and a hen; whereupon the foiled fiend vanished amid fumes of brimstone.

For eight centuries that bridge has watched the Danube's ever-changing pageant. It saw the Crusaders' fleets. It saw five ensuing centuries of stagnation, when, owing to the upstream thrust of Tatar and Turkish hordes, traffic moved via Europe's sea routes, and the great river, given over to piracy, sank into eclipse. It witnessed a 17th-century trade revival, when sailboats, bearing freight and passengers between developing market towns, took ten days to descend to the middle Danube. And finally, in 1817, it beheld the freak craft of a Hungarian who, borrowing transatlantic ideas, actually made paddle-wheel boats move by steam.

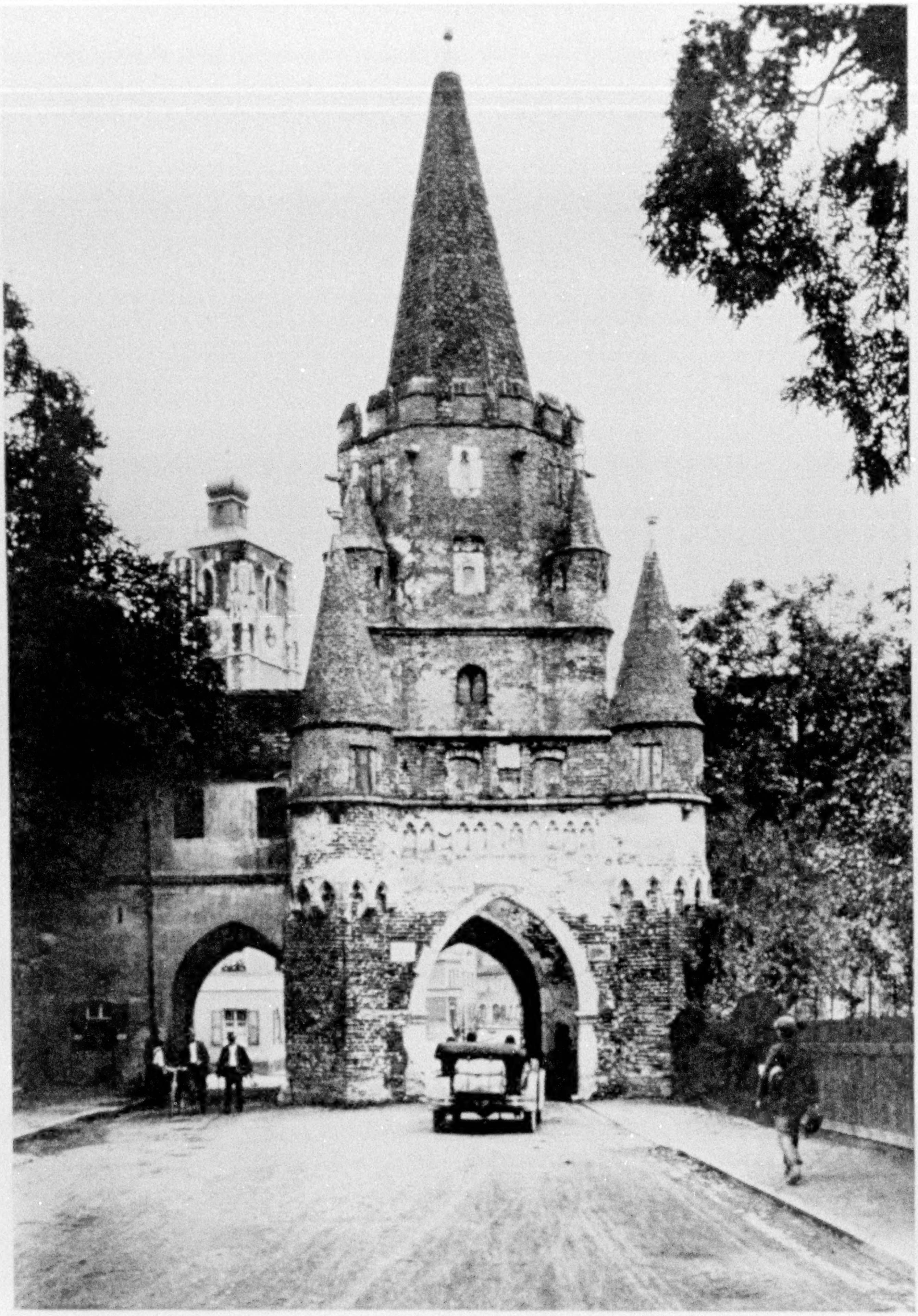
That ancient bridge marks the limits of commercial navigation on the Danube. Regensburg is the westernmost of its 18 harbor towns that, as distributing centers, handle annually some 6,000,000 tons of river traffic for interior points and for the 8,000,000 people living on the Danube's shores. That figure is still under one-half of its prewar traffic and is far behind the enormous volume now trans-



Photograph by Karl Obert

GRAPE HARVESTERS OF KAISERSTUHL, IN BADEN

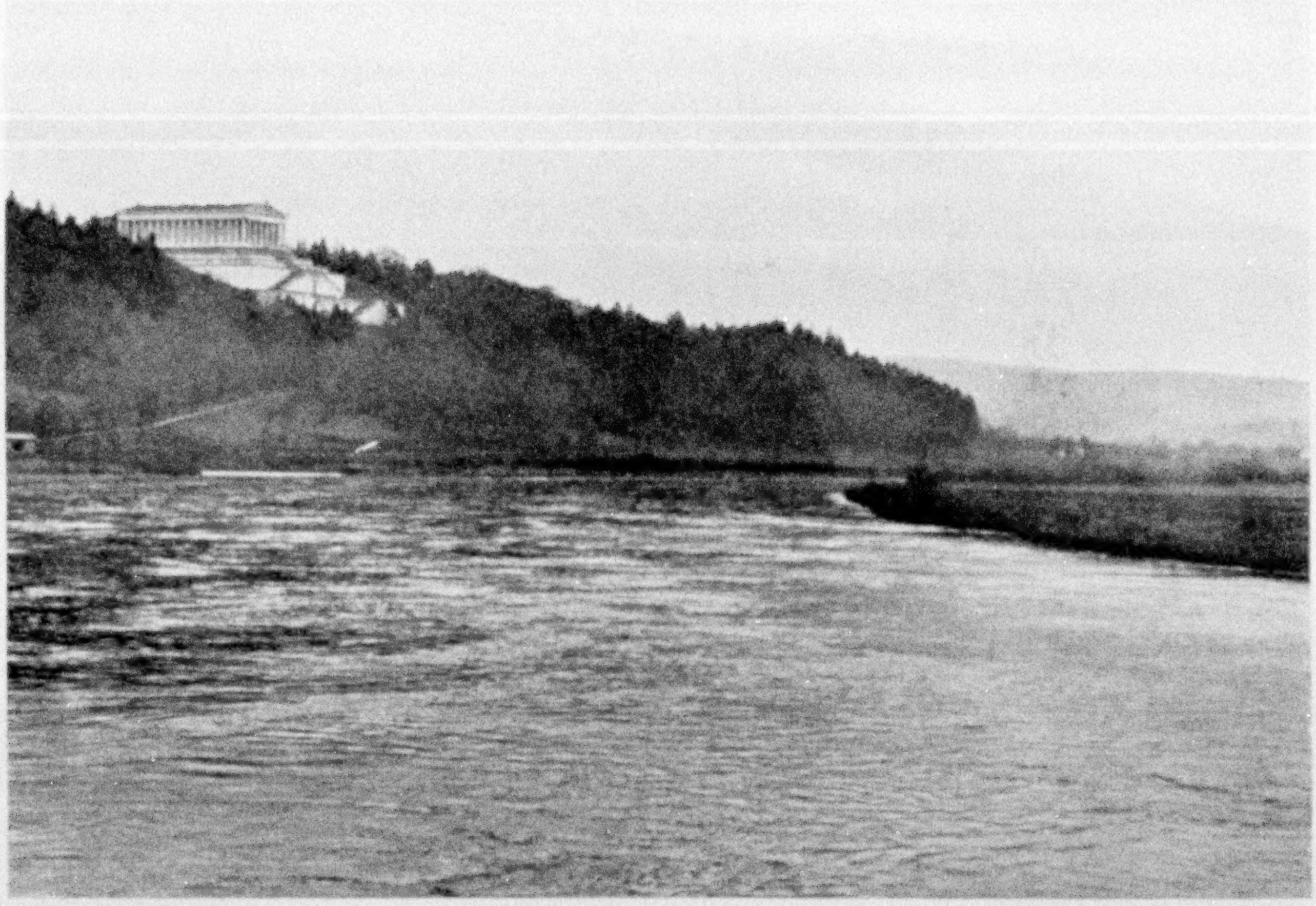
The fame of the excellent wine of this district has spread far beyond the German borders.



Photograph by Ewing Galloway

IN THE 16TH CENTURY INGOLSTADT HAD A UNIVERSITY WITH 4,000 STUDENTS

The old Bavarian city was once of considerable importance and figured prominently in the controversies of the Reformation. General Tilly, famous soldier of the Thirty Years' War, died here in 1632. The Kreuztor, or Cross Tower, formed part of the ancient town walls.



Photograph by Melville Chater

"THE GERMAN TEMPLE OF HONOR STANDS ON A MOUNTAIN BY THE DANUBE"

Built by Ludwig I of Bavaria about a century ago, this stately, Parthenonlike edifice, near Regensburg, is one of the most impressive sights along the great river.

ported on the highly industrialized Rhine.

By post autobus we continued to follow an ever-narrowing Danube. At Kelheim we passed its last deep gorge, where ascending fishing boats must be hauled ahead by long lines attached to rings in the rock faces.

We spent a day inside the medieval walls of Ingolstadt, once noted for the university attended by Dr. Faustus of black-art fame. We lingered another day where Ulm's tremendous Gothic spire, almost as lofty as the Washington Monument, towers over the Danube.

AT THE HEADWATERS OF THE DANUBE

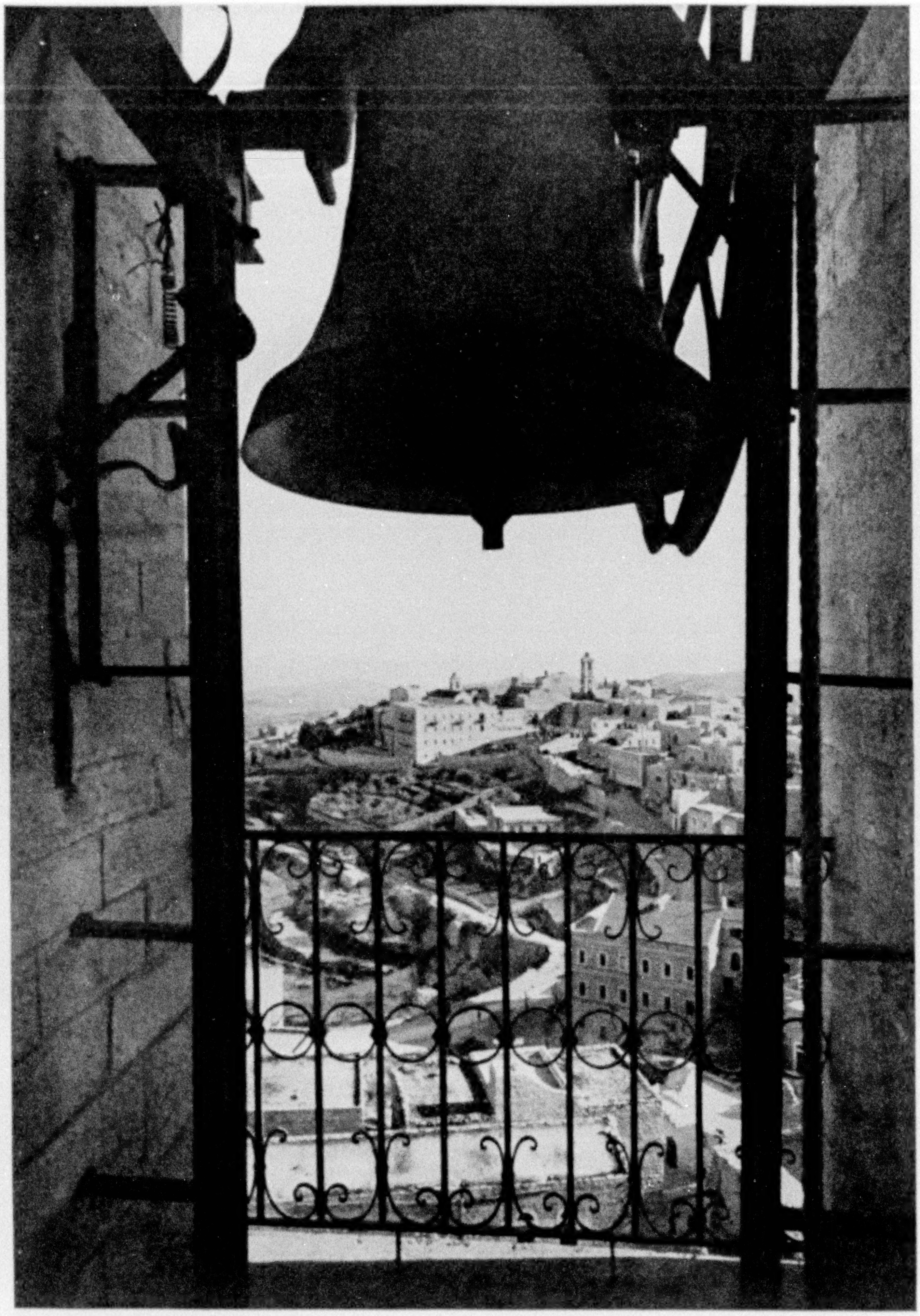
Afoot, we entered its wild Upper Valley, where ruinous castles, inaccessible as eagles' nests, crest precipitous rocks. The Black Forest's fringes began to enfold a slender Danube that rushed along in its youthful playtime, with no other care than to serve some lumber mill, where singing stream and screaming saw mingled their resonances under the dark pines.

For three nights of increasing cold we lodged at humble forest inns, where woodcutters drank schnapps and smoked huge drop-pipes around the great porcelain stove; and on the third night our host assured us that we were close to Donaueschingen, where the Fürstenberg spring joins the brook Brigach to form the Danube.

That last day was made memorable by an amateur blizzard and by walls of mist that closed blindingly about us. It wasn't until the close of daylight that we sleuthed a smell of cookery, which led us to a mist-emerging inn.

It turned out that we had overshot Donaueschingen and followed the Brigach for 20 miles. Exhausted, we fell asleep over our supper, reawakening just long enough to get to bed.

From beneath our window rose the shrill chant of the Brigach rushing down from the Sommerau. Our hodgepodge associations of Greeks and Romans, tugs and barges, Tatars and Crusaders, gypsy bands and cathedrals, became slumber-blended into one abiding theme. It was that of the Danube, pulsing onward into ever-widening vistas, blending Occident with Orient, sundering, yet uniting, peoples, in his ageless course from the Black Forest to the Black Sea.



GLAD TIDINGS RING OUT FROM HALLOWED SPIRES IN BETHLEHEM

A grilled opening in the chapel belfry of the boys' school, "The Father of the Orphan," makes a fitting frame for a view of the home of Christmas, with the two towers of the Church of the Nativity in the distance.

BETHLEHEM AND THE CHRISTMAS STORY

By John D. Whiting

Author of "From Jerusalem to Aleppo," "Village Life in the Holy Land," "Jerusalem's Locust Plague," "The Last Israelitish Sacrifice," "Among the Shepherds of Bethlehem," in the National Geographic Magazine

With Illustrations from Photographs by American Colony Photographers

When I was a little boy, members of my family, recently returned from the Holy Land, were guests of friends in our home town in America. An elderly and much-loved mammy of the household in which we were visiting was brought in to see "the children that had just come from Jerusalem."

At the sight of us her dark face lit up. "De good Lord bless me," she said. "I thought Jerusalem was up in Heban."

So it is with Bethlehem. We all know of it as a small town in Judea and sing about it in our carols, but probably few realize how much it still contains that helps us to visualize the First Christmas. To those who know it well—its narrow, winding streets and lanes, cobblestone paved; its age-old homes, with walls of rough-cut stone grown mellow with years of sunshine; its vineyards, olive yards, and terraced gardens; and, most of all, its people and their Biblical customs—it still speaks vividly of the Nativity story.

The town, crowning a hill and dominating open valleys to the east and south, lies just far enough to the north of the busy road that links Jerusalem and Hebron to be undisturbed by congested traffic. With the exception of a handful of Moslem neighbors, its 6,000 hospitable inhabitants are all Christians and live together in amity.

BETHLEHEMITES ARE A THRIFTY PEOPLE

It is not to be supposed, however, because we find here a pervading spirit of peace, quiet, and friendliness, which to a great extent is missing in the larger neighboring cities, that the Bethlehemites are an indolent, easy-going people. Quite the contrary. It is not only the absence of political and religious animosities among them, but their thrifty industry that has brought on a state of well-being.

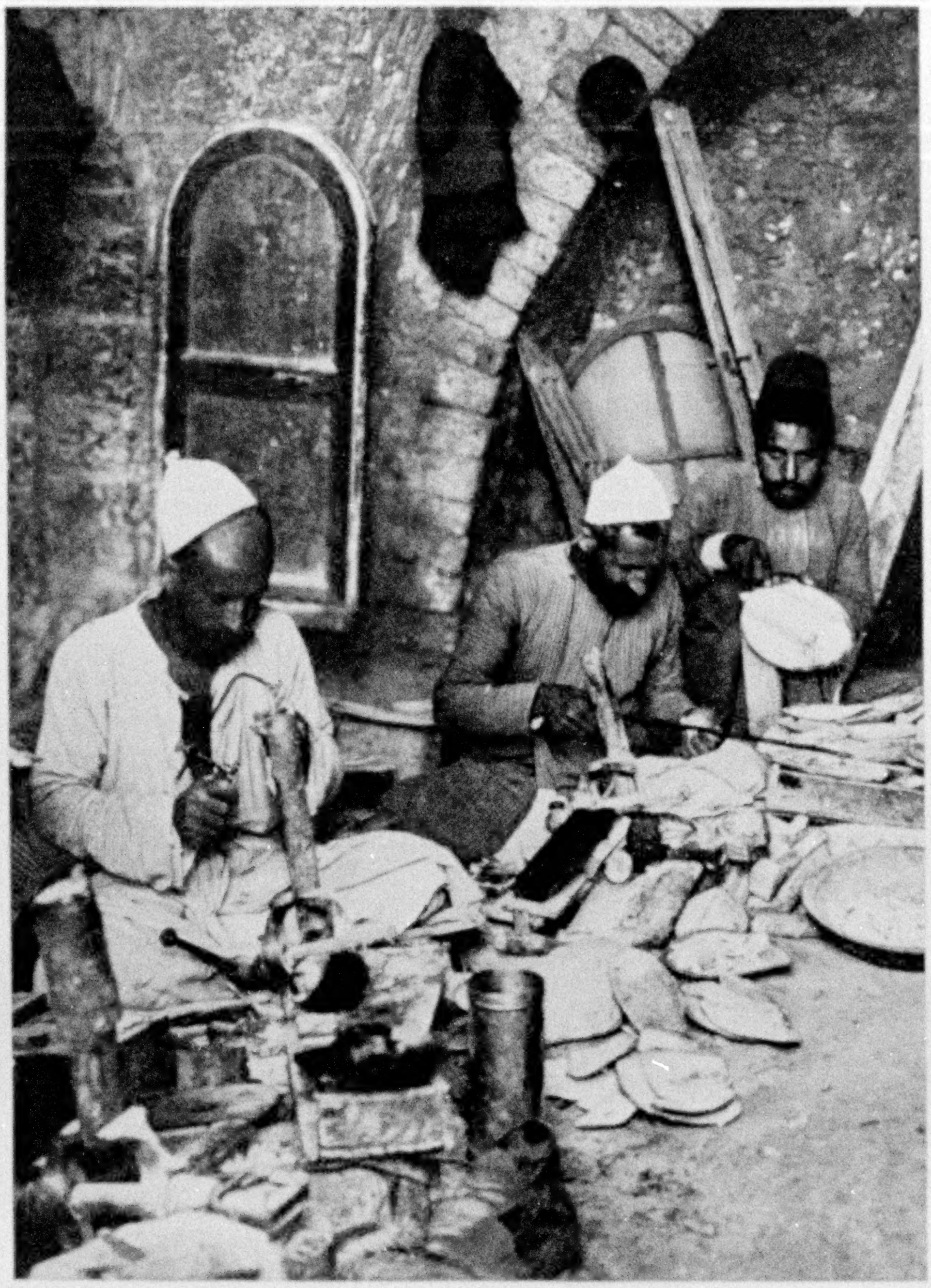
As we pass through the confined thoroughfares, now under a vaulted archway, now up by a steep flight of street steps, we may hear the hum and screech of tools carving pearl shell into ornaments or cutting thick sections of the same material into beads. The result may be a brooch, pendant, or necklet to bring joy to a lady upon the return of the pilgrim purchaser to some distant land. It may be an intricately carved and inlaid crucifix to hang, perhaps, on the wall of some small, lonely chapel; or it may be a snow-white rosary mounted with pure silver, destined to find its way into a convent.

These handicrafts, which, according to local standards, have brought at least a decent living, sometimes have been the avenues to modest wealth. Best of all, the industries have cultivated a sense of independence and self-respect in the natives.

The places of work are by no means sweatshops, although hours of labor are long and hard; nor do they savor of the factory. The shop consists of a room or two in the home or adjoining it. Sometimes only the members of a family work together; at other times a few outsiders are employed. Sitting cross-legged on the floor and working with the simplest tools and contraptions, the artisans turn out beautiful things; and, while the squeak of a saw or the rasping noise of many files cutting away at the hard shell is not a pleasant note, still, unless they have stopped to return in flowery Arabic the salutations of passers-by, the workers probably will be found passing otherwise irksome time in singing in unison tunes centuries old.

Going along a winding side alleyway in the Shepherds' Village one day, I came upon four damsels squatting on the floor of their room, inside a darkened doorway, busy with hand bows and drills. They were boring holes through pearl cubes which eventually would be finished into rounded beads.

One of the workers was a mother, though she was scarcely 18 years old. Swinging in front of her was a tiny hammock, and in it the bluest-eyed baby, smil-



BETHLEHEM HANDWORKERS FASHION UNIQUE PRODUCTS

The man at the left is making a lacelike fretwork medallion for a brooch or pendant. With bow and drill, the second bores holes in beads. The third craftsman has been carving Biblical pictures, probably copied from old artists. Da Vinci's "The Last Supper" is a favorite subject. The huge shells which provide the raw material of the shop formerly came exclusively from Red Sea and Persian Gulf pearl fisheries, but now many are obtained from Australia.

ing and happy. A miniature cookstove, upon which rested an ample pot, stood behind the mother, and she had time between borings for an occasional loving coo to the child, a gentle push to the swaying hammock, and an efficient stir to the pot with a large wooden spoon. The husband was a quarryman and would be hungry when he returned home.

A little way beyond this shop a solitary man sat under the dense shade of a fig tree, making beads from a palm seed known commercially as "vegetable ivory," but locally as "Mecca fruit." These beads are dyed in vivid colors and made up into Moslem rosaries, on which the faithful repeat their prayers. Large numbers find their way through the markets of Arabia to Mecca and Medina.

SOME SEEK FORTUNE IN FOREIGN LANDS

Not all the folk of Bethlehem are humble laborers. Many families are modestly well off. Their men have journeyed afar in their youth, mostly to the South American countries, and there have built up fortunes, beginning possibly as peddlers, then operating retail stores, and finally becoming wholesalers and supplying the newcomers from their native land. Prosperous as a result of their efforts in the countries of their temporary adoption, these merchant princes have returned to pass their declining years in the homes of their boyhood.

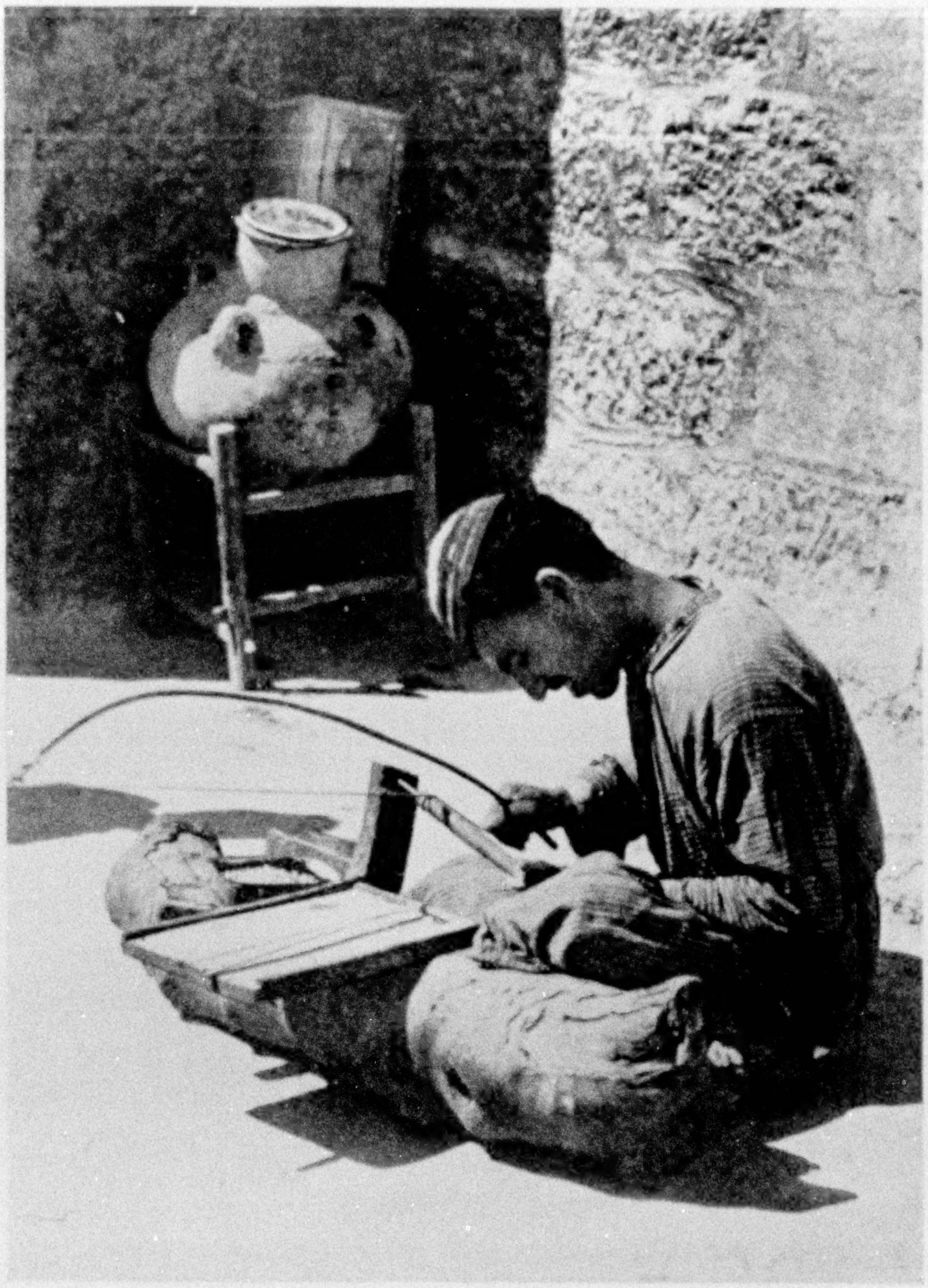
Many such successful adventurers began life in the Bethlehem pearl shops, saving a small amount from each thousand beads turned out. By dint of hard work and patience, they gathered enough for steerage tickets and, once abroad, they were helped along by their compatriots already established.

Others of them came from more pretentious families. Their fathers may have boasted of being "coffee and spice merchants," importers of commodities in the period before the countries around this end of the Mediterranean were opened to world commerce by steamer and railroad.

Those were the days of the sail ship and the desert camel, when the merchant did not write or telegraph for his goods, but instead took long journeys, selected and bargained for his wares, and with them returned home by caravan.

When about to start for a foreign land, Bethlehem youths still think much of *Ridda Waldain,* the parting blessing of their parents; they attribute their success to it. It reminds one often of the patriarchal blessings as recorded in Old Testament narratives. We read that when Rebekah had chosen to leave the land of her nativity and journey to be the wife of Isaac in Canaan, her mother and brethren blessed her and sent her away with the words, "Be thou the mother of thousands of millions" (Gen. XXIV: 60).

Again we see Jacob supplant his elder brother and receive the parental blessing, causing Esau in the agony of his soul to cry "with a great and exceeding bitter cry," and say unto his father, "Bless me, even me, also, O my father!" (Gen. XXVII: 34).



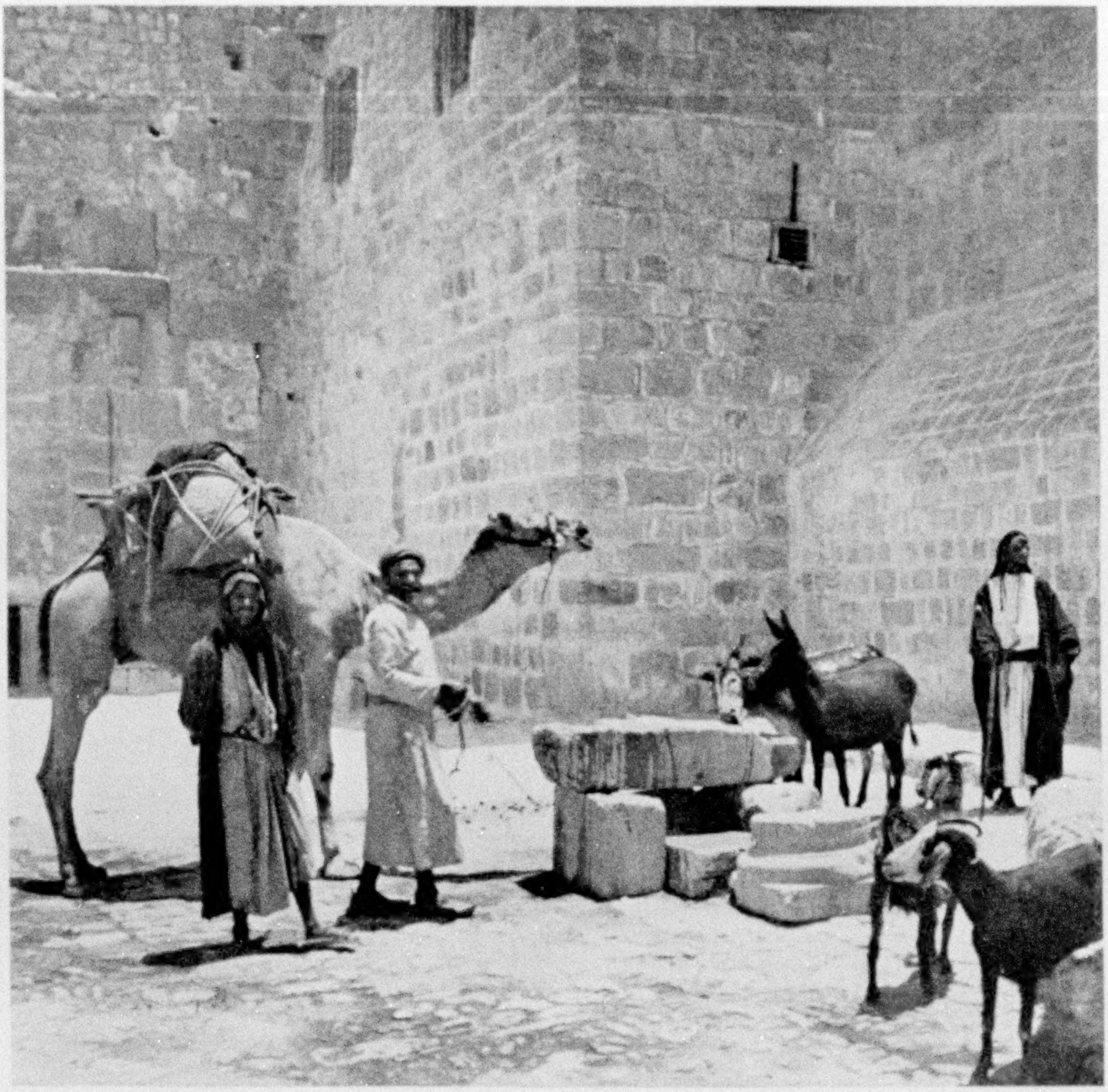
BOW DRILLERS WORK WITH INCREDIBLE SPEED

A skilled artisan sometimes bores 3,000 beads in a day. The material used is mostly the gnarled thicker parts of shells formerly discarded as waste by New York pearl-button factories, but now shipped in enormous lots to Palestine. It is first soaked, then cut into strips, which are filed with coarse rasps into pencil-like sticks. Bits of these of the desired length are clamped in wooden vises and perforated as shown here.

YOUTHS ARE COUNSELED TO COME HOME TO MARRY

Usually parents counsel their sons not to marry of the maidens of the land in which they sojourn, just as Abraham, in his declining days, while Isaac was still young, made his "eldest servant, that ruled over all he had, swear by the Lord," enjoining him, "Thou shalt not take a wife unto my son of the daughters of the Canaanites among whom I dwell; but thou shalt go unto my country, and to my kindred, and take a wife unto my son Isaac" (Gen. XXIV: 3, 4).

When the elder son has become firmly established in the foreign land in which he has sojourned, he sends for his younger brother, or perhaps a cousin, to join him. The newcomer, in a few years, usually takes the place of his superior and permits him to return home for a visit to his native Bethlehem.



CAMELS STILL COME LADEN TO THE PLACE WHERE JESUS WAS BORN

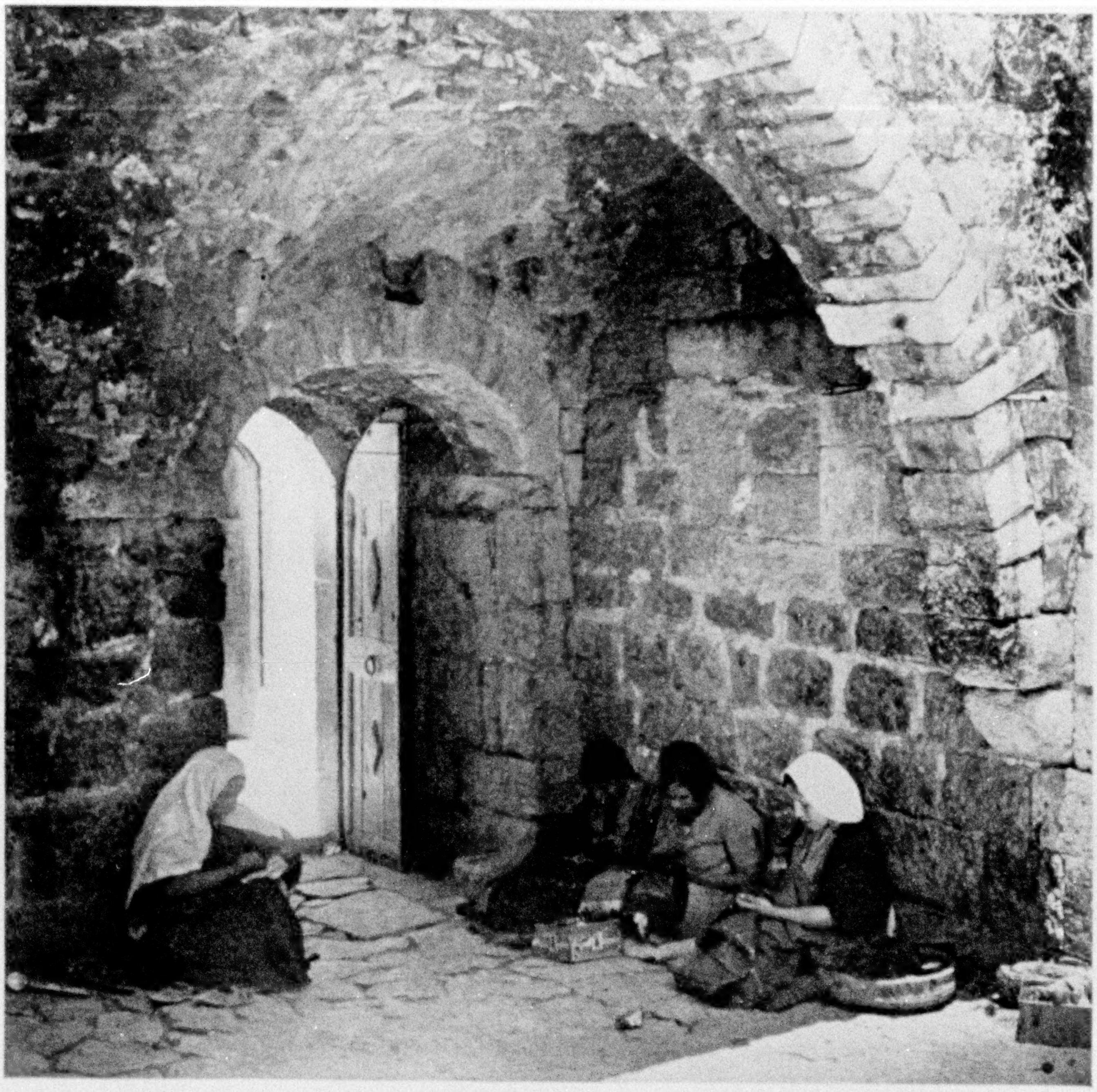
All the main streets of Bethlehem lead to the market square in front of the Church of the Nativity (see text, page 717). The tiny door at the extreme left is the entrance to the basilica. Above and at the side of the low opening can be seen the outlines of the original stately portal, long since walled up. Donkeys, much in use to pack light burdens, are drinking at the centuries-old rock trough at the cistern mouth. The milch goats have been brought here for sale.

Such a visit is the occasion for great rejoicing, particularly on the part of the proud mother. Merry are the songs that are sung on the road from the Jerusalem railroad station. To-day the visitor is whisked home in a modern car; yesterday, so to speak, he came in a carriage; before that he trudged home afoot or rode a saddle animal, a cavalcade of prancing horsemen and a procession of singing women accompanying him. But still the songs and rejoicing are just the same as in earlier days.

Sumptuous feasts are spread for any and all who will partake, long lines of friends come to make their salutations over a period of days or even weeks, and all the neighborhood is astir and happy. Careful attention to the conversations discloses that the boast of nearly all the guests is some relationship, friendship, or affiliation with the rich home-comer.

PREPARATIONS FOR A WEDDING ARE ELABORATE

Scarcely has the mirth and joy over the return subsided when a greater excitement is in store. The mother has carefully eyed



VAULTED PORCHES SERVE AS SEWING ROOMS

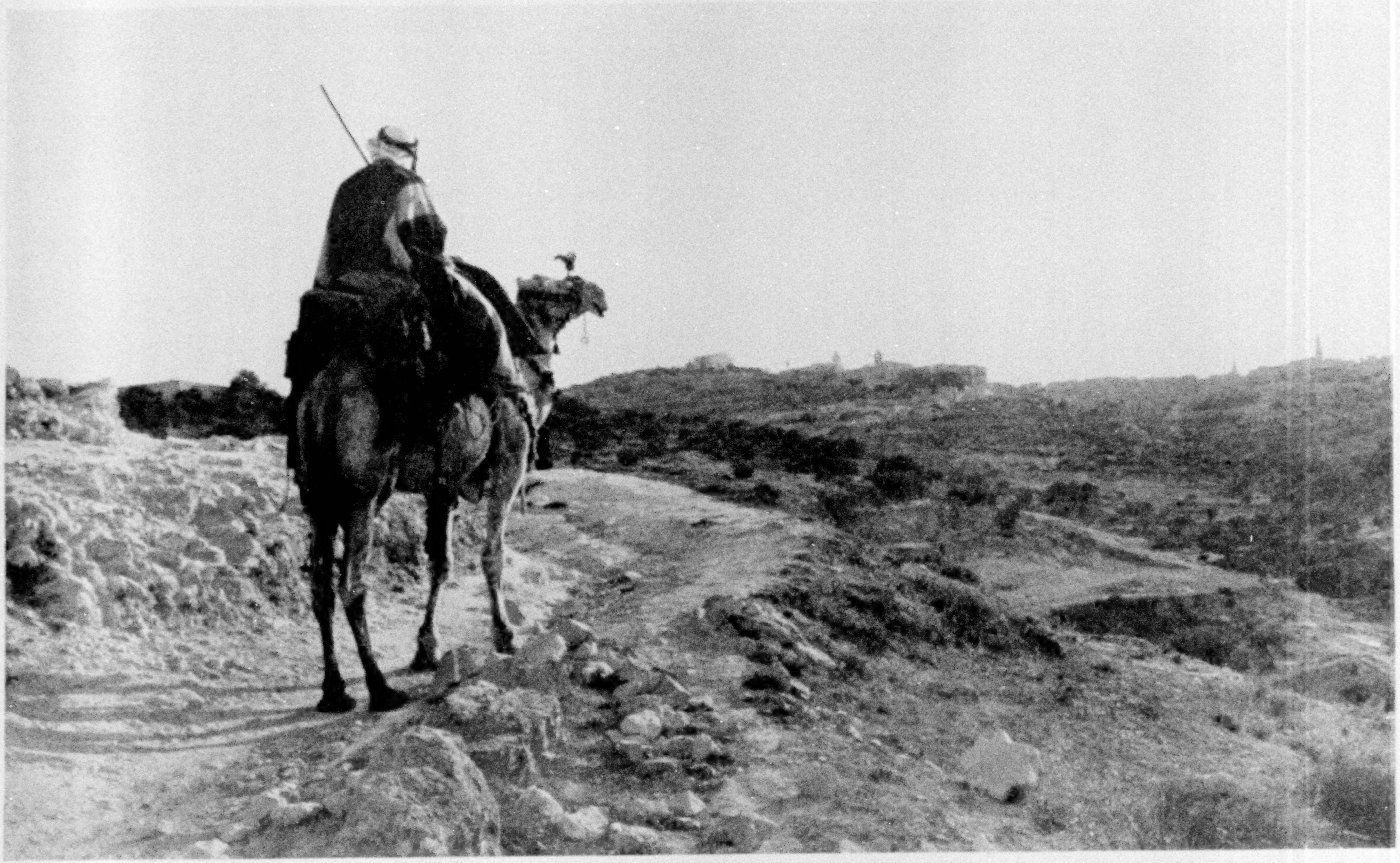
Bethlehem homes are built around open courts, and much needlework is done in the shady nooks just outside the doors. The mother and her three daughters are embroidering bridal or feast-day costumes for shopkeepers of the town, who furnish materials and pay the women for their labor.

for some time each eligible maiden and has selected one as a desirable wife for her son. The youth has agreed to his mother's choice, possibly even before seeing the bride elect; the girl and her parents are willing and a wedding is in prospect.

Of several Bethlehem weddings I have attended, one remains outstanding because of its uniqueness.

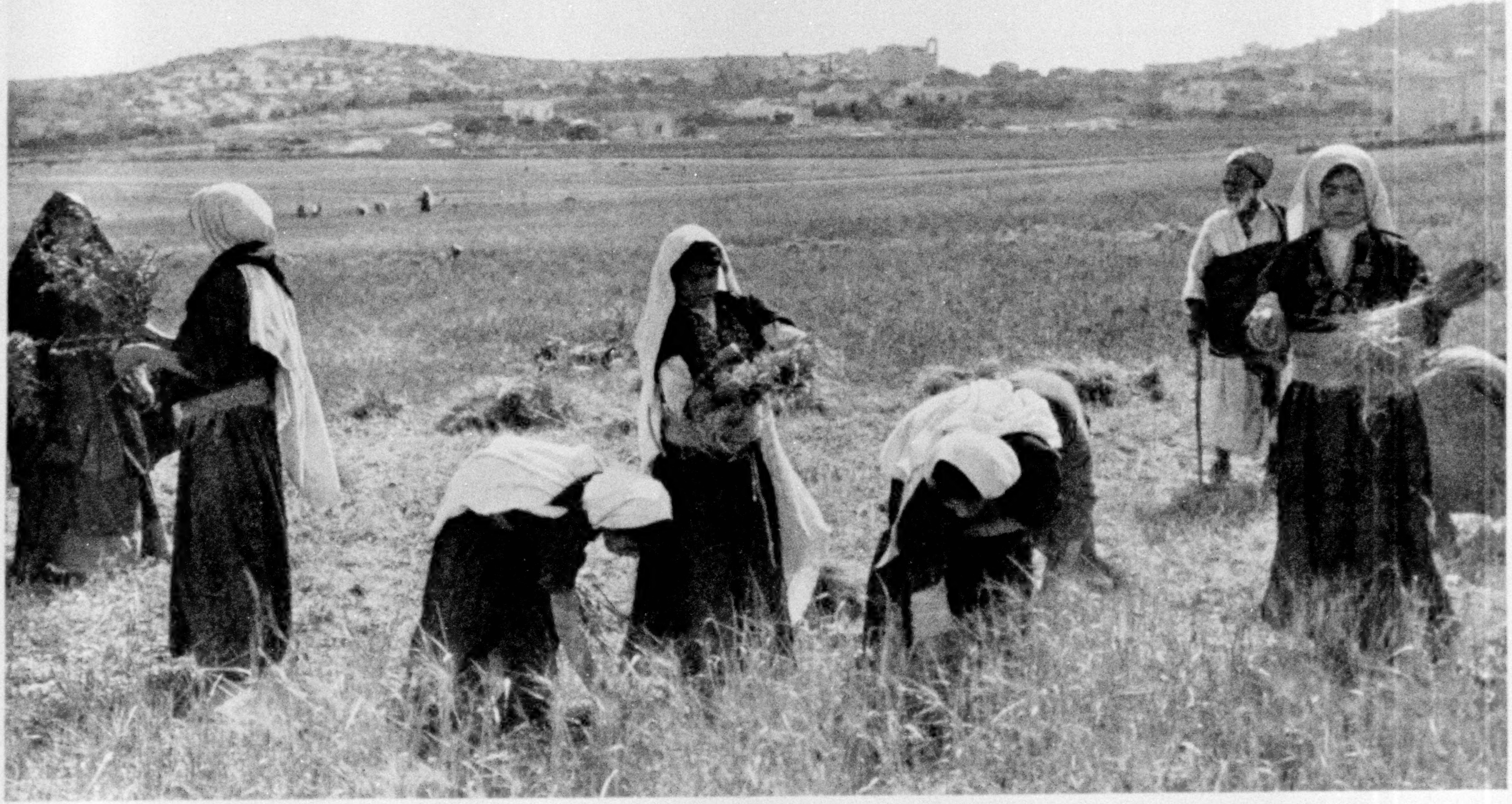
Years before the event, the four sons of a merchant had sought their fortunes in occidental lands, and now the third generation was stepping into the business. The eldest brother, a large, gray-bearded and kindly-eyed patriarch, had retired and returned to Bethlehem, where he was living in a new house surrounded by many members of the combined families. Upon the completion of the regal mansion his son came home from abroad to be married.

On the day set for the wedding many guests arrived, both natives and foreigners. Men, women, maidens, youths, children, mothers with swaddled babies—all were crowded together and carried along in a stream of overflowing happiness. The hosts and hostesses manifested their welcome by a flow of Arabic salutations remarkable for beauty of language and sincerity of purpose. There was a great deal



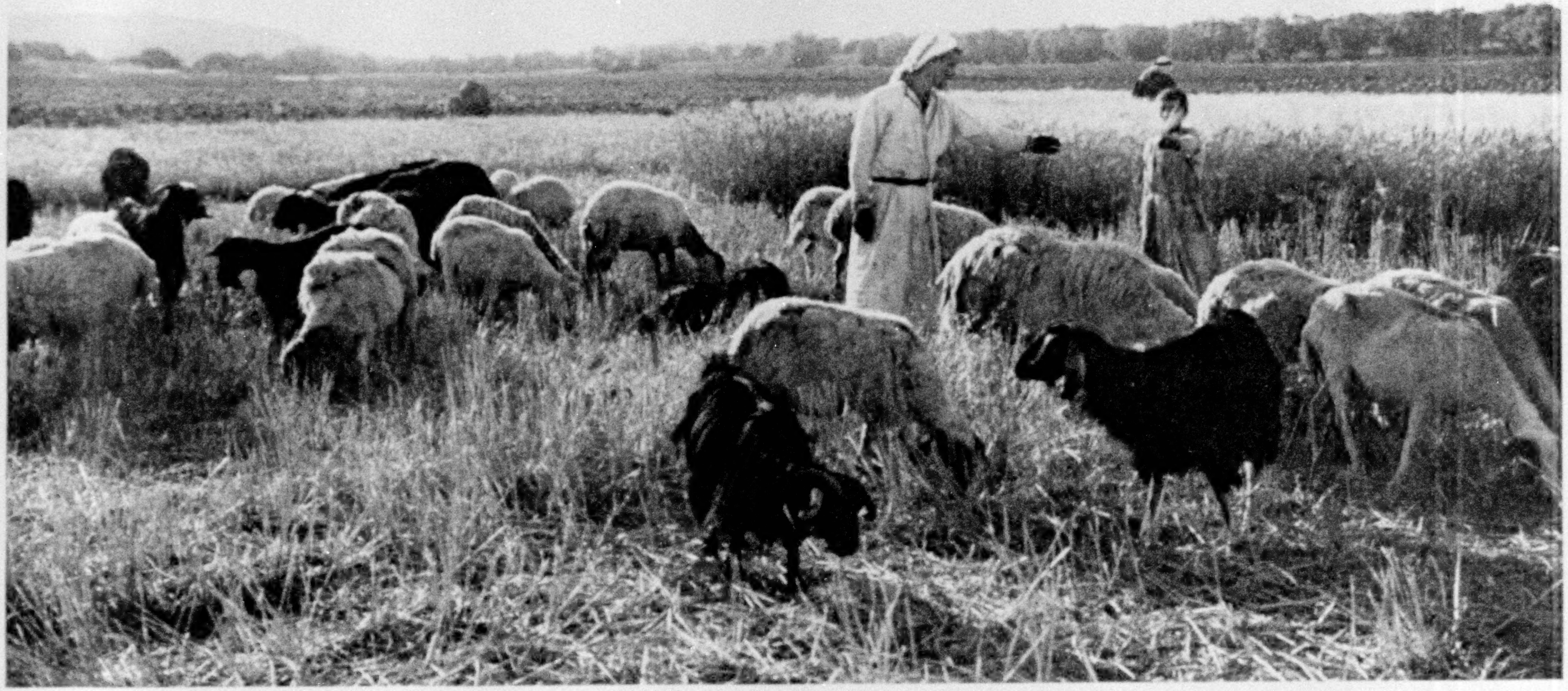
MOUNTAIN PATHS TO BETHLEHEM HAVE CHANGED LITTLE IN 2,000 YEARS

Although important highways of Palestine are now smooth, tarred roads for motor-truck and passenger-automobile traffic, there are still trails over which travel is possible only with camels or donkeys. This solitary rider has delivered his goods in Jerusalem and is returning home. His attire and equipment are probably almost identical with that of the Three Wise Men of old.



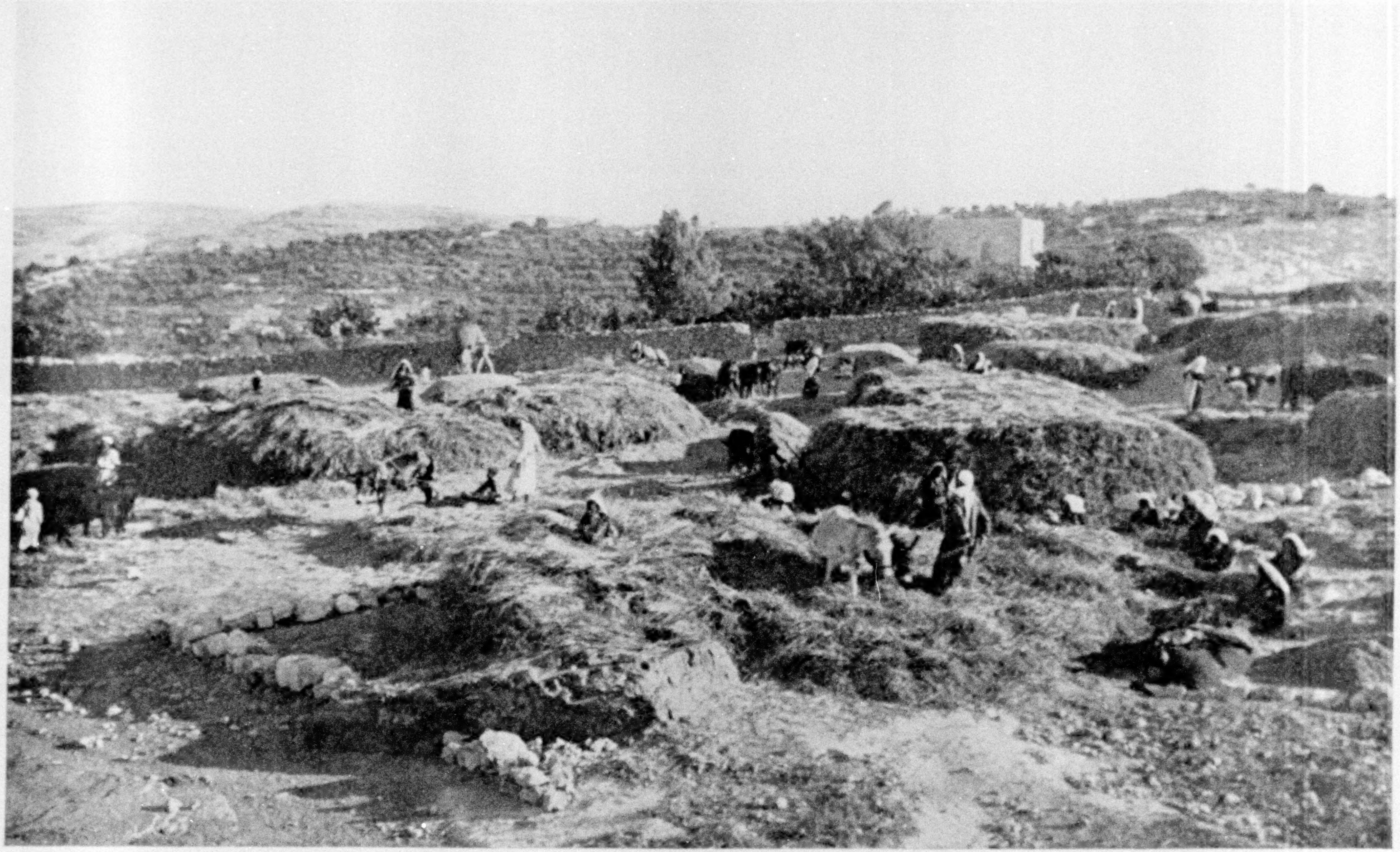
PRIMITIVE METHODS OF REAPING PREVAIL IN "THE HOUSE OF BREAD"

Wheat, called "corn" in the Bible, is gathered to-day just as it was in the days of Ruth (see text, page 725). The women workers, here presided over by a modern Boaz, wear just such capacious veils as that in which the Moabitess received six measures of grain as a gift from her employer. The village Beit Sahur lies in the background, and Bethlehem is hidden in the hills beyond.



FLOCKS GRAZE WHERE THE GRAIN HAS BEEN CUT

When reaping is done with the sickle, many ears of wheat are dropped. The owners of the fields follow the Biblical injunction and permit the poor to glean first. Sheep are then driven into the stubble to pick up what remains on the ground (see text, page 725).



BETHLEHEM THRESHING FLOORS HAVE RECEIVED THE HARVESTS OF AGES

When the sickles have been laid aside by the reapers and the loosened sheaves heaped on these surfaces of flat rock, every man's share in its separate pile, the grain is trampled out by shod mules and donkeys, or more often by oxen, each with eight small iron shoes nailed to its cloven hoofs. The method has remained unchanged since the days of Ruth and Boaz (see text, page 725).

of commotion and bustling preparation. An abundance of good things was urged upon everybody, as each new guest arrived.

This scene of hospitality recalled vividly to my mind the story of the home at Bethany, when "Martha was cumbered about much serving, and came to Him and said, 'Lord, dost Thou not care that my sister hath left me to serve alone? Bid her therefore that she help me'" (Luke x: 40). The hostesses, resplendent in their colorful attire of silk, broider work, and linen, were worn and tired like Martha, but happy after three days of cooking, feasting, and entertaining with music and dancing.

WESTERN AND EASTERN FASHIONS CLASH

Those of the hosts who had lived abroad donned for the occasion their Parisian black frock-coat suits; white shirts, ties, and gloves; and patent leather shoes. But even in such conventional attire East met West; each wore, indoors and out, a high red fez, or tarboosh, with swinging black tassel, and the bridegroom's father stroked his massive beard and nervously fumbled his amber beads.

The bridegroom was a handsome youth with a pleasing manner. The culture he had gained during his sojourns abroad was becomingly blended with the typical native reverence and submission to his parents and elders.

The bride, still in her teens, and wearing the costume of her people, made a picture befitting the brush of the best Madonna artists. Her *tobe,* or dress, was of the heaviest, handspun silk, red, with broad side stripes of green, the skirt widened with gores of scarlet, orange, and olive, and the bodice embroidered with silk and golden threads. She wore a folded cashmere girdle and over all a jacket of plush covered with colorful embroidery. Her face was encircled by a double fringe of gold coins surmounted by a white silk veil of ample proportions, and, as the sun's rays through the window caught the glitter of the precious metal, the reflection vividly suggested a halo.

Elsewhere in Palestine this fringe of coins about the virgin face gives way on marriage to more solid rows of dowry coins, but in Bethlehem and two adjacent villages the married woman dons a *shatweh,* or tall, pointed cap, worn under the veil, with the dowry gold sewn on the upstanding front.

A BRIDE IN WHITE VIOLATES NATIVE CUSTOM

As the hour of the church service arrived, the bride reappeared, wearing an imported dress of white satin and high-heeled slippers. Bedecked with the conventional orange blossoms and veil, she looked uncomfortably awkward. She walked arm in arm with the bridegroom, who likewise was clad in the latest of occidental styles. The bride had waited for her wedding day to discard her native costume, in which, quite unconsciously, she was stately and beautiful; the modes of the West were entirely foreign to all her surroundings and unfitted to her peculiar, erect, queenly bearing and determined stride.

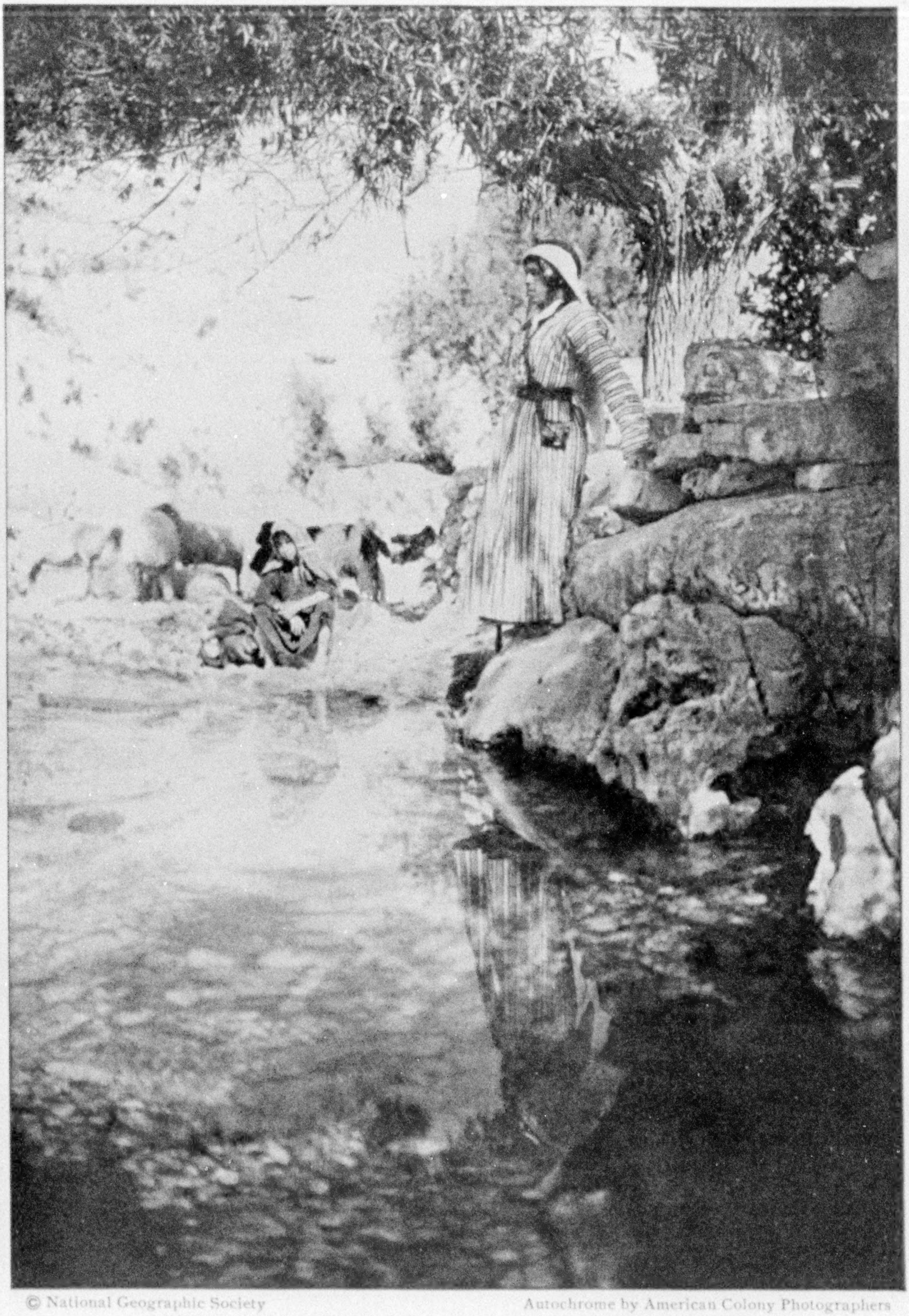
A bride in white is quite contrary to the native custom. When this girl's mother was married, artists in spinning, hand weaving, embroidery, and gold and silver smithing vied with one another to make her attire a riot of colors harmoniously blended into a thing of beauty befitting a country of sunshine.

Color has ever been the Eastern idea of beauty. In a parable, Jesus, speaking of the lilies, says: "Solomon in all his glory was not arrayed like one of these" (Matt. vi: 29). The Westerner has taken this to refer to the white lily as we know it. Not at all. What is meant by the lily is the anemone, a bulbous perennial that grows wild in Palestine, in great profusion of scarlet and purple, the royal colors of the Hebrews.

As the bridal train neared the old village, the party increased in number and its color and picturesqueness were enhanced. The men wore large turbans of vivid orange interwoven with threads of silver and gold. They were robed in flowing garments of striped silk girded with cashmere-shawl belts, and their outer cloaks were of seamless wool or camel's hair.

THE STRANGER IS MADE WELCOME

In Bethlehem no offense is taken if the uninvited choose to follow and take part in the joyous occasion; in fact, almost the contrary spirit is shown. The custom reminds one of the parable Jesus related of a king making a marriage feast for his



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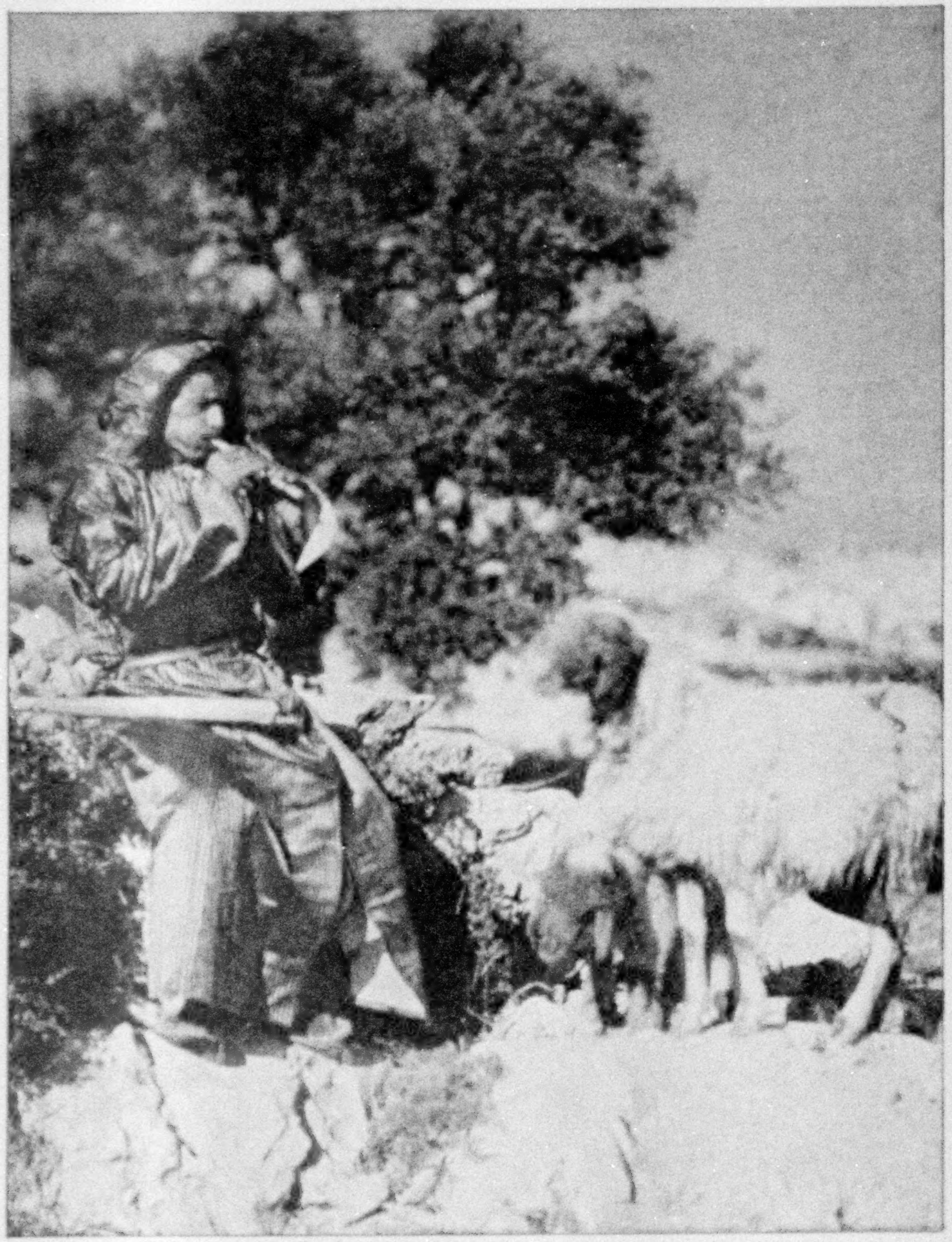
DESERT SHEPHERDS LEAD THEIR FLOCKS BESIDE STILL WATERS

Because for seven or eight hot months of each year in forestless Palestine not a drop of rain falls, Biblical writers in psalm, proverb, and legend extolled the virtues of cold and living water, fountains, and brooks, and described vividly the torture of thirst.



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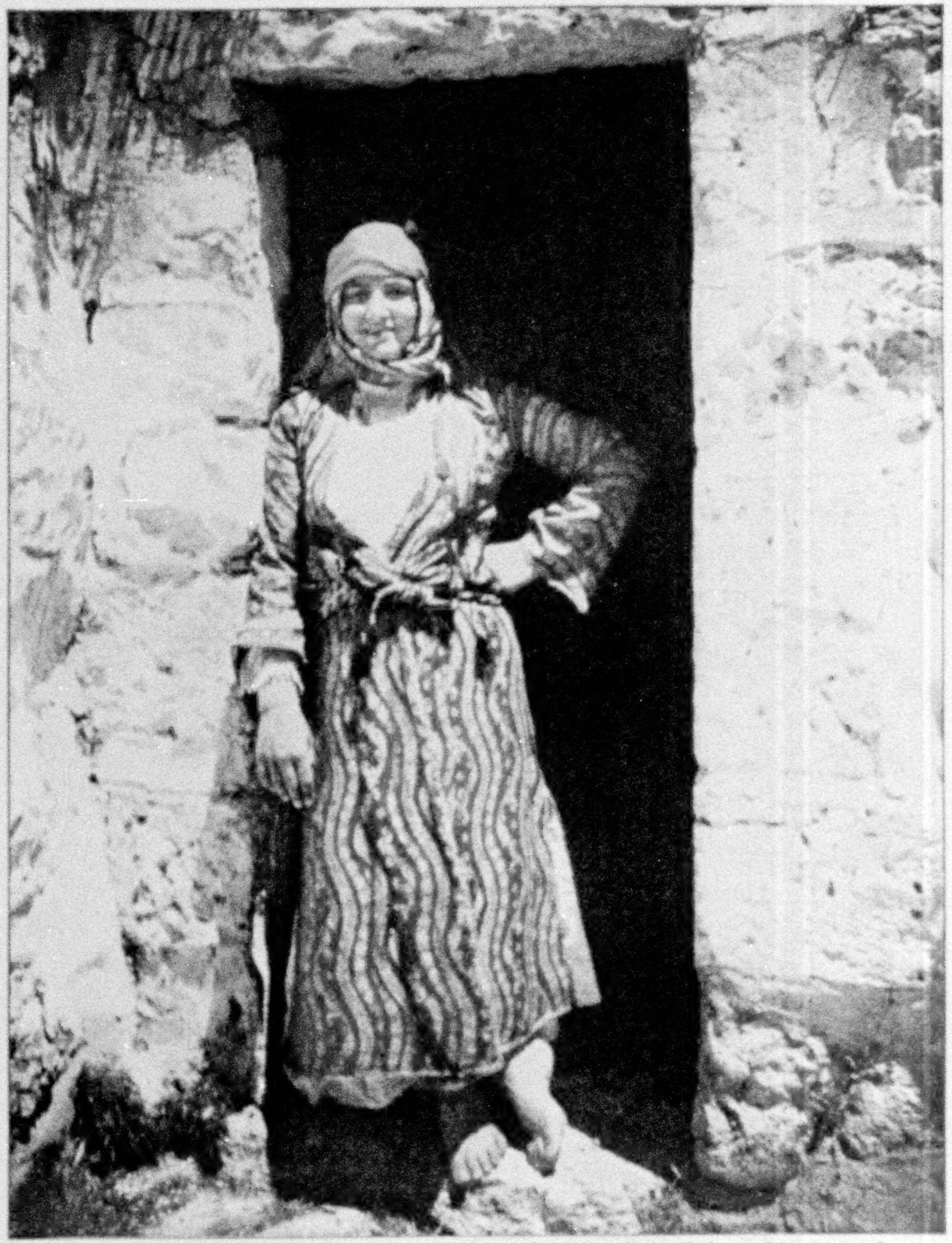
THUS YOUNG DAVID PIPED HIS SHEEP TO FOLD

Many of these quaint instruments, forerunners of modern church organs, are still made by Palestine shepherd boys from the reeds that grow about the fountains, though the better ones are fashioned from the bones of eagles' wings. The music is eery but strangely appealing, a sort of haunting, plaintive minor.



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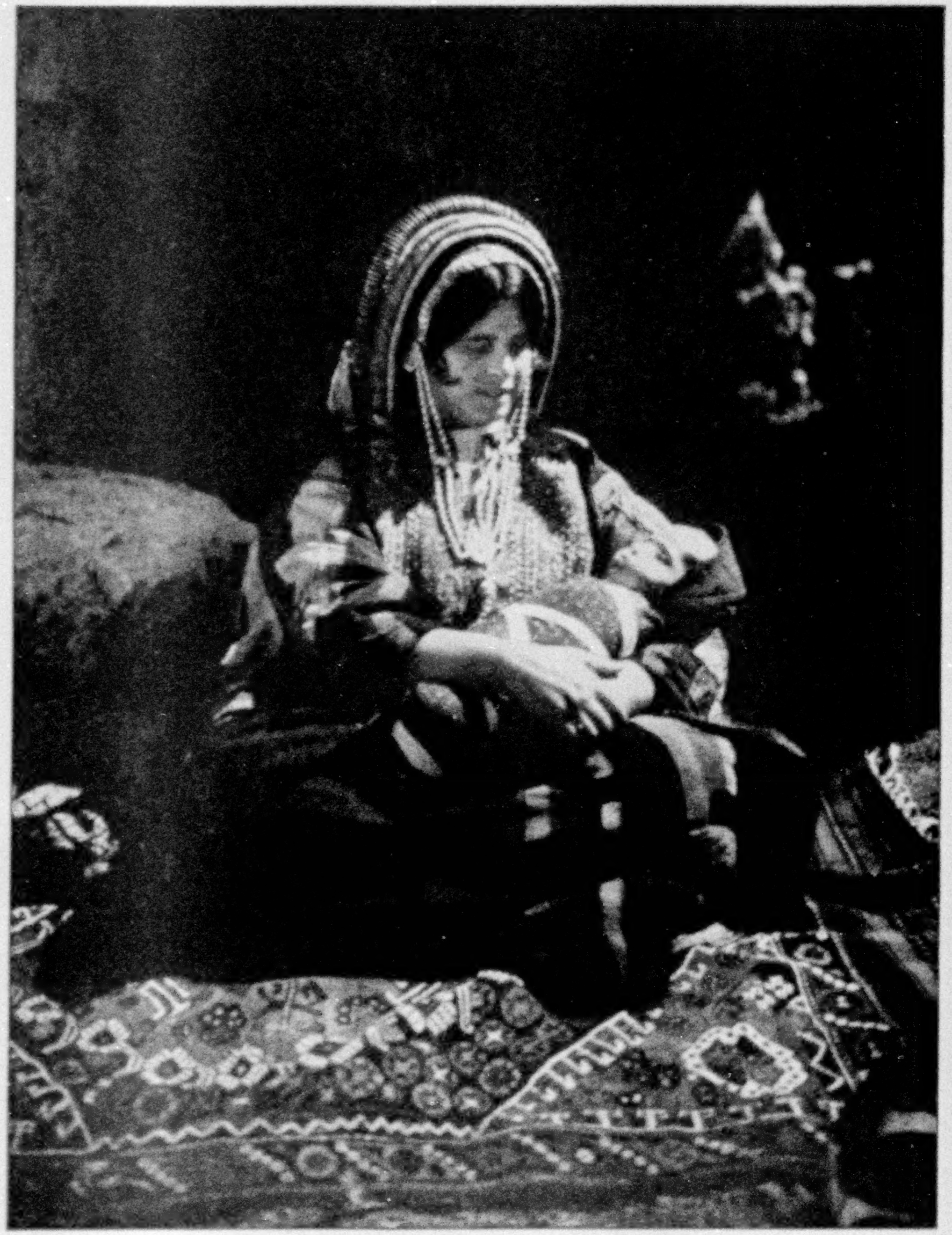
SHE IS CLAD LIKE THE LILIES OF THE FIELD

Handspun Tyrian purple and wrought gold braid make this girl's costume, a heritage from her grandmother, rival the colorful anemones of Palestine, the "lilies" of the Bible. Bobbed hair and short skirts have reached the cities, but in small towns such as Bethlehem and Nazareth, old ways of dress prevail.



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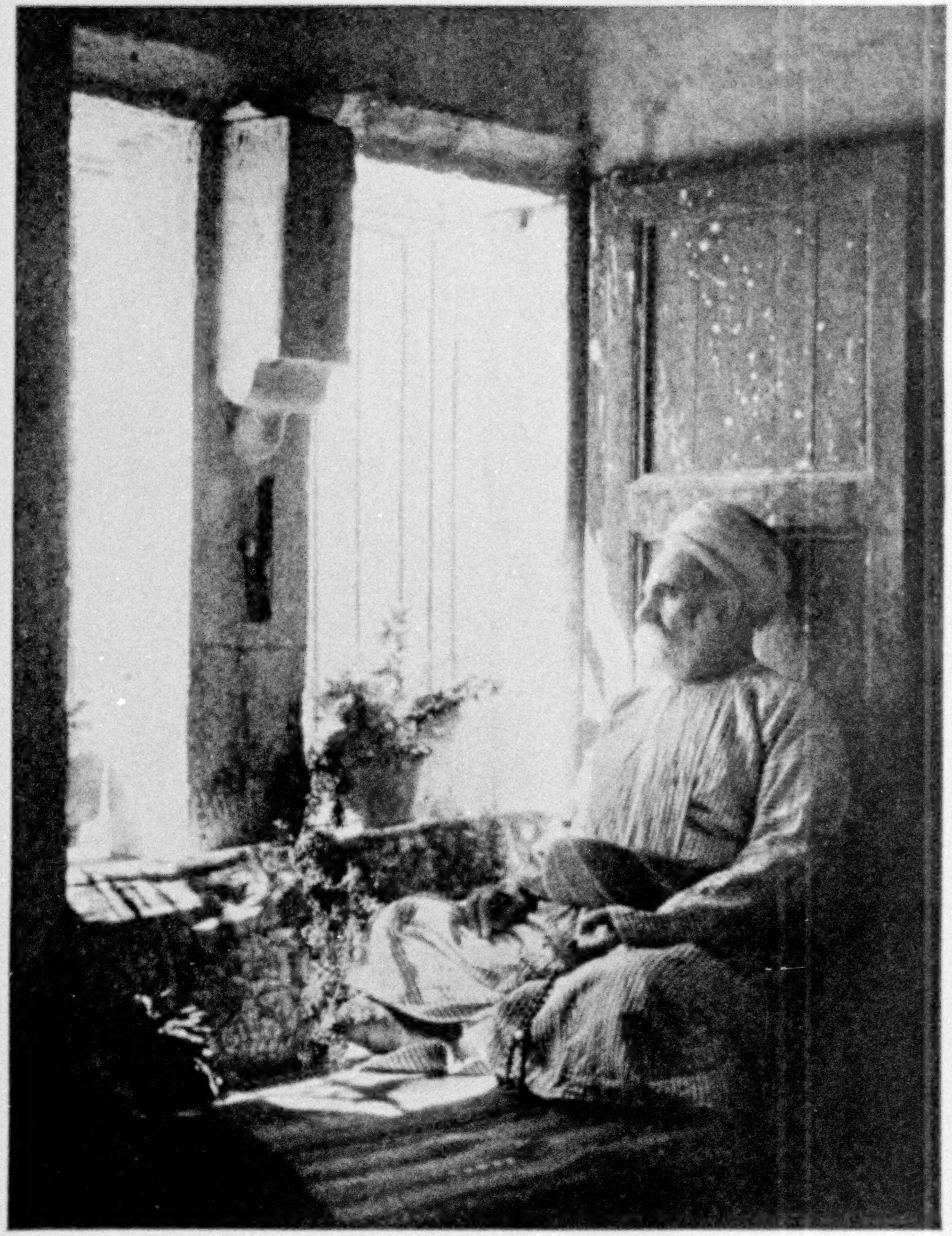
LIKE A HALO GLEAMS THE MOTHER'S HEADDRESS

Virgins of the village of Judea wear small rows of coins about their faces, which, at the time of marriage, give way to the heavier chaplet of the wedding dowry—possibly the origin of the golden circles surrounding the heads of subjects in early religious pictures.



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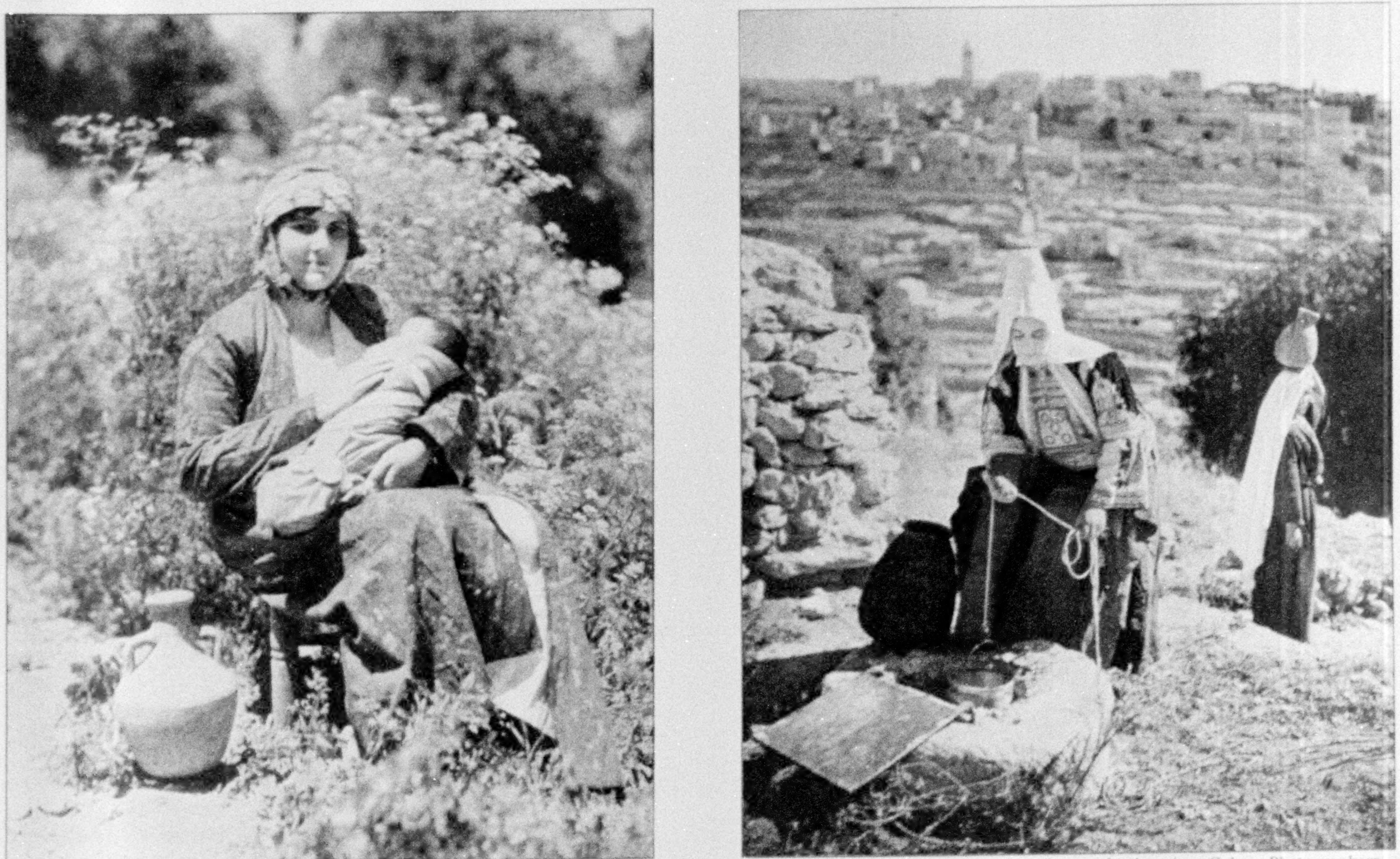
IN THE EAST AGE BRINGS RESPECT AND DEFERENCE

As Boaz sat in the gateway of Bethlehem and called upon passers-by to join him in discussing questions of the time, so this patriarch of to-day sits cross-legged on the window sill of his guest chamber, ready to receive those who come for advice and decision.



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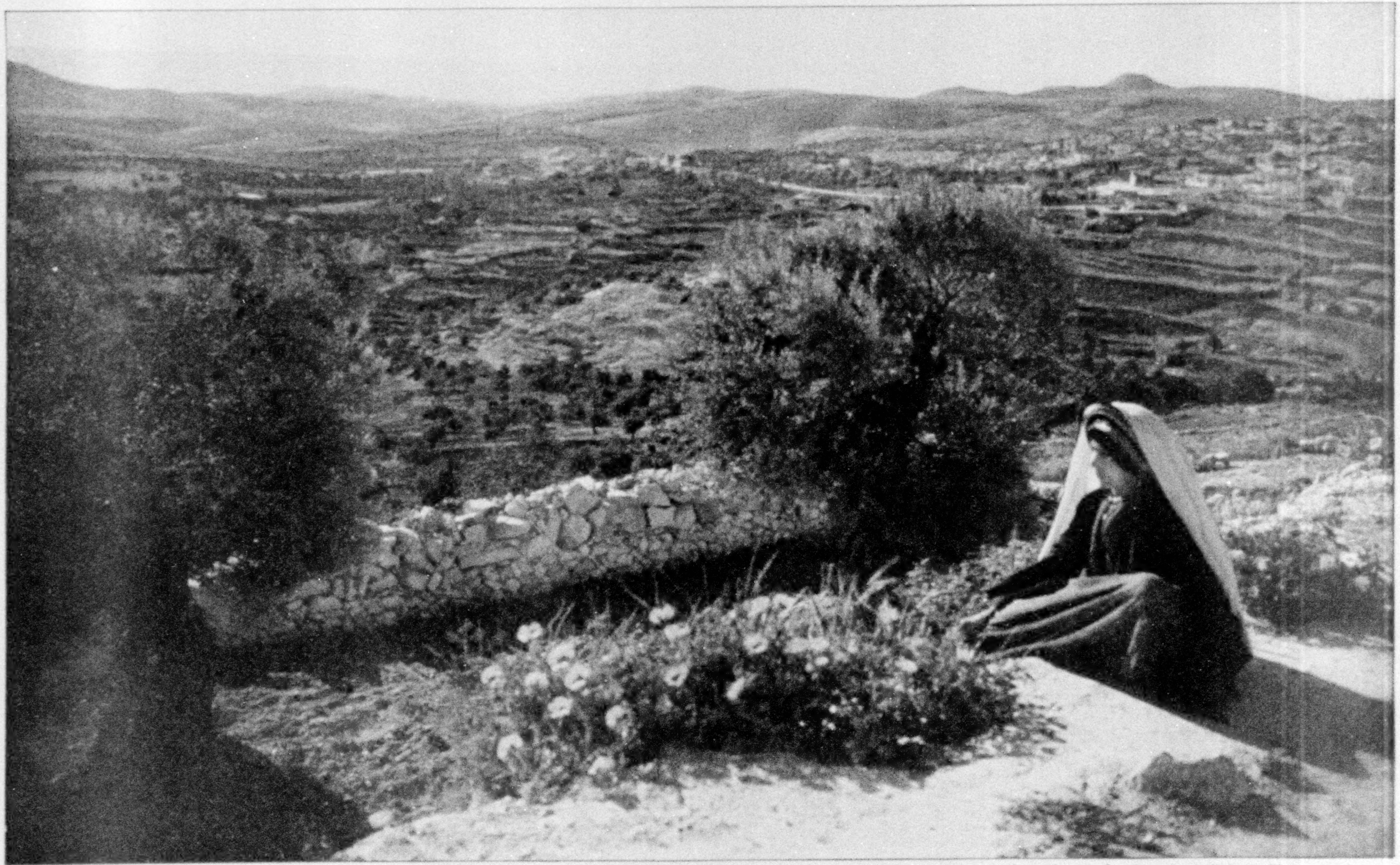
NATIVE COSTUMES WILL SOON BE ONLY A MEMORY IN PALESTINE

The young mother of the shepherd village with her infant wrapped like the Christ Child in swaddling clothes, the gorgeously appareled woman at the cistern of Bethlehem—both represent types that will die out with the present generation. The high cap and elaborate dress worn by the water drawer are of a style pictured on ancient pottery Astarti recently excavated at Jerusalem and centuries older than the Christmas story. Scholars formerly believed this fashion to be an importation by Frankish crusaders.



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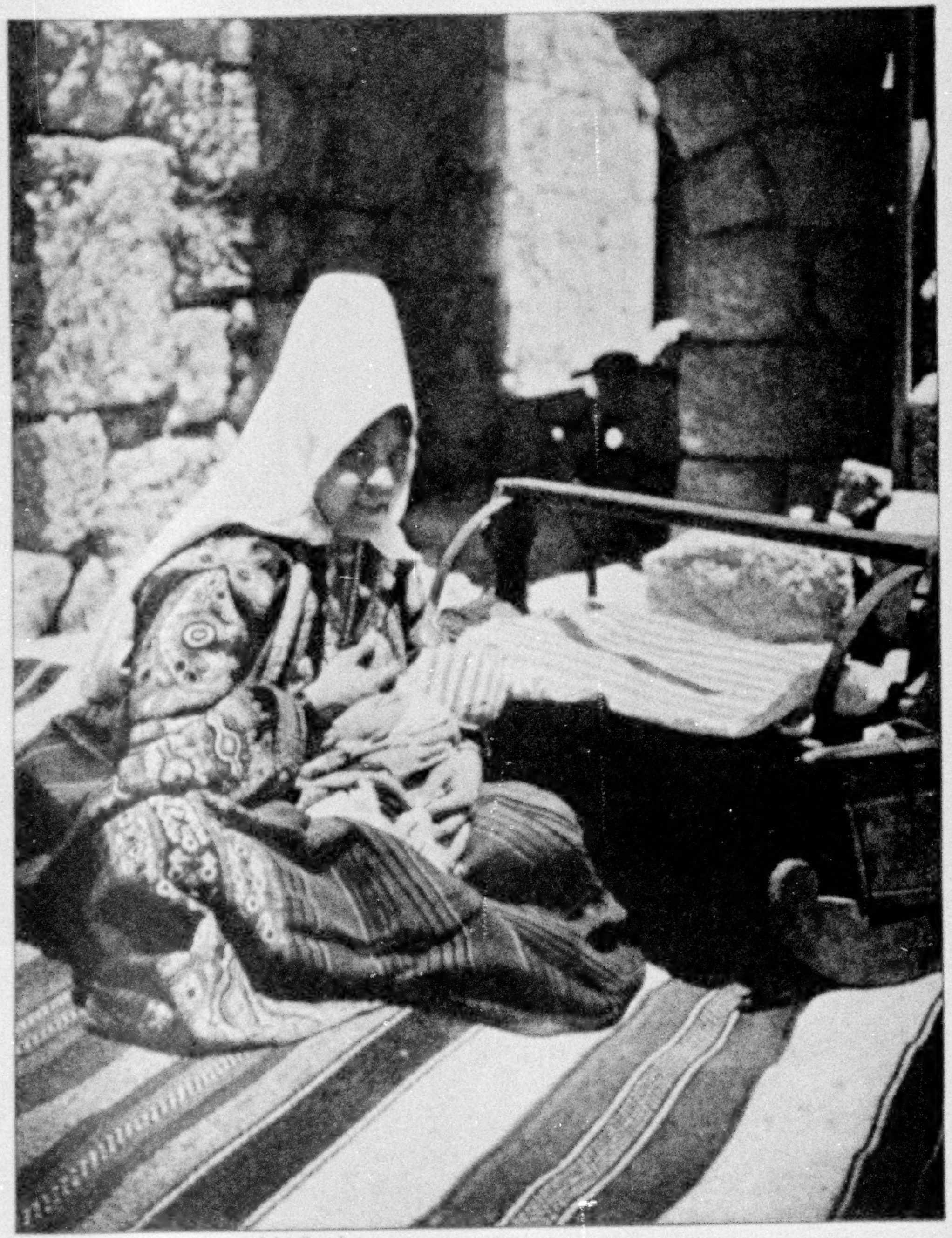
IN THE FIELDS BEYOND BETHLEHEM BOAZ REAPED AND RUTH GLEANED

Every available inch of mountainside has been terraced and planted. Here the olive, fig, and pomegranate thrive, and in the open valley below wheat and barley ripple in the sunlight. The hills in the background are the Range of Moab, and the cone-shaped peak is Herodium.



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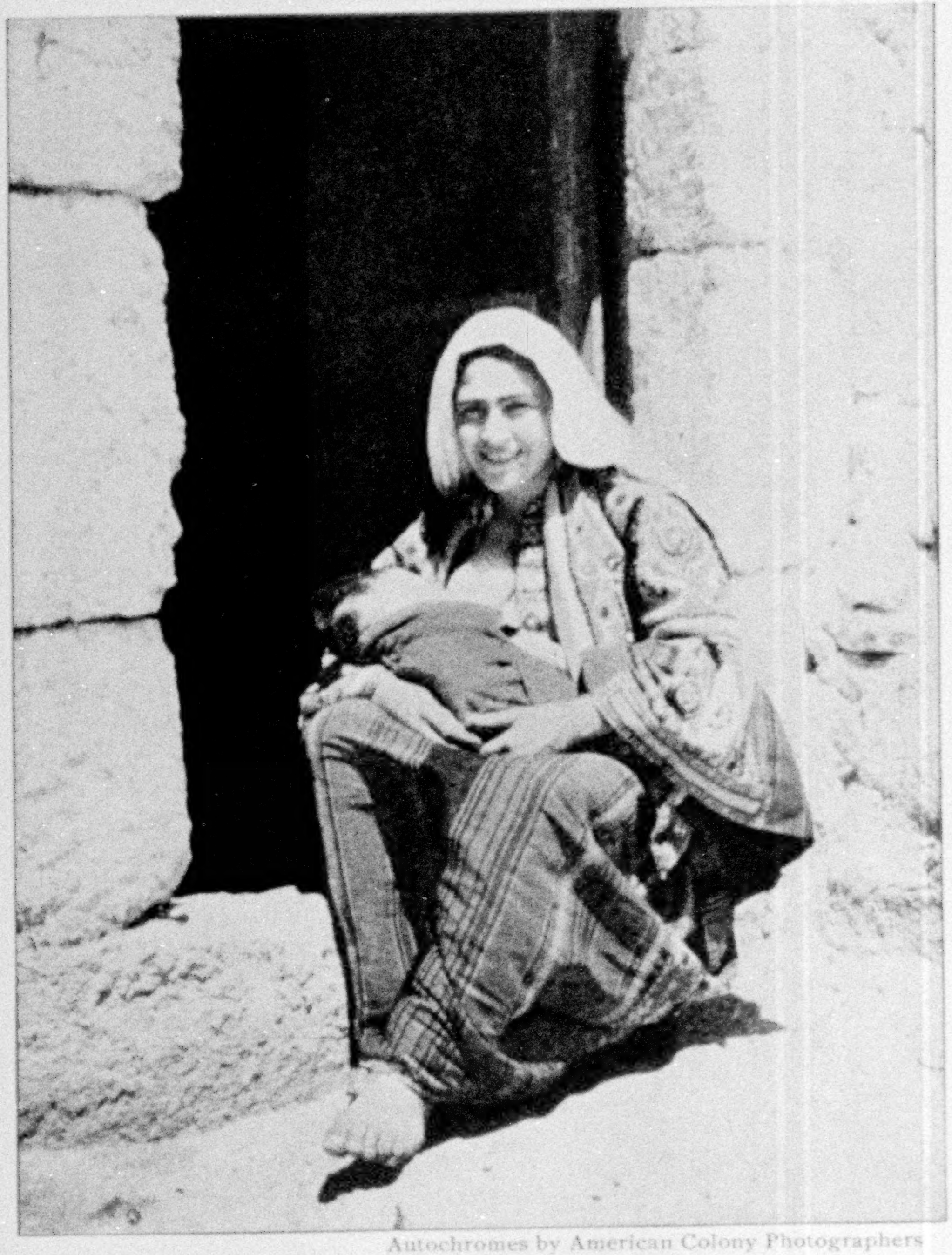
BETHLEHEM MOTHERS NURSE THEIR BABES

This young woman's costume is a triumph of spinning, hand-weaving, embroidery, and silver and gold smithing. A cradle or small hammock is always provided for the infant a few days after its birth. Its first bed is a low-sided market basket of straw or willow.



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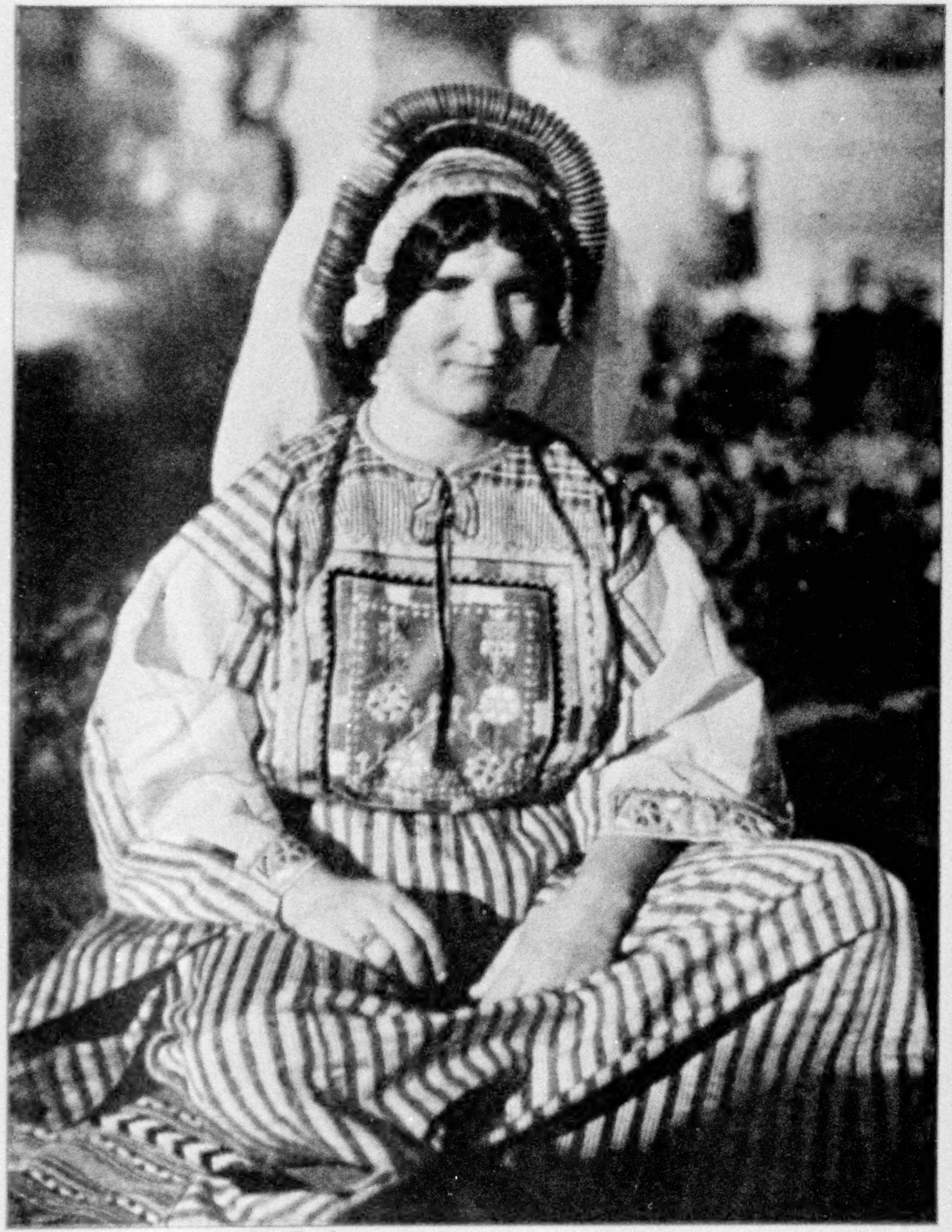
COMELY AND GENTLE IS THE VILLAGE MADONNA

From the tedious labor of boring pearl beads the little mother of the shepherd cot has come to sit for a while on her doorstep and lull her babe to sleep. She is scarcely 17 years old, yet she is versed in all the housewifely arts.



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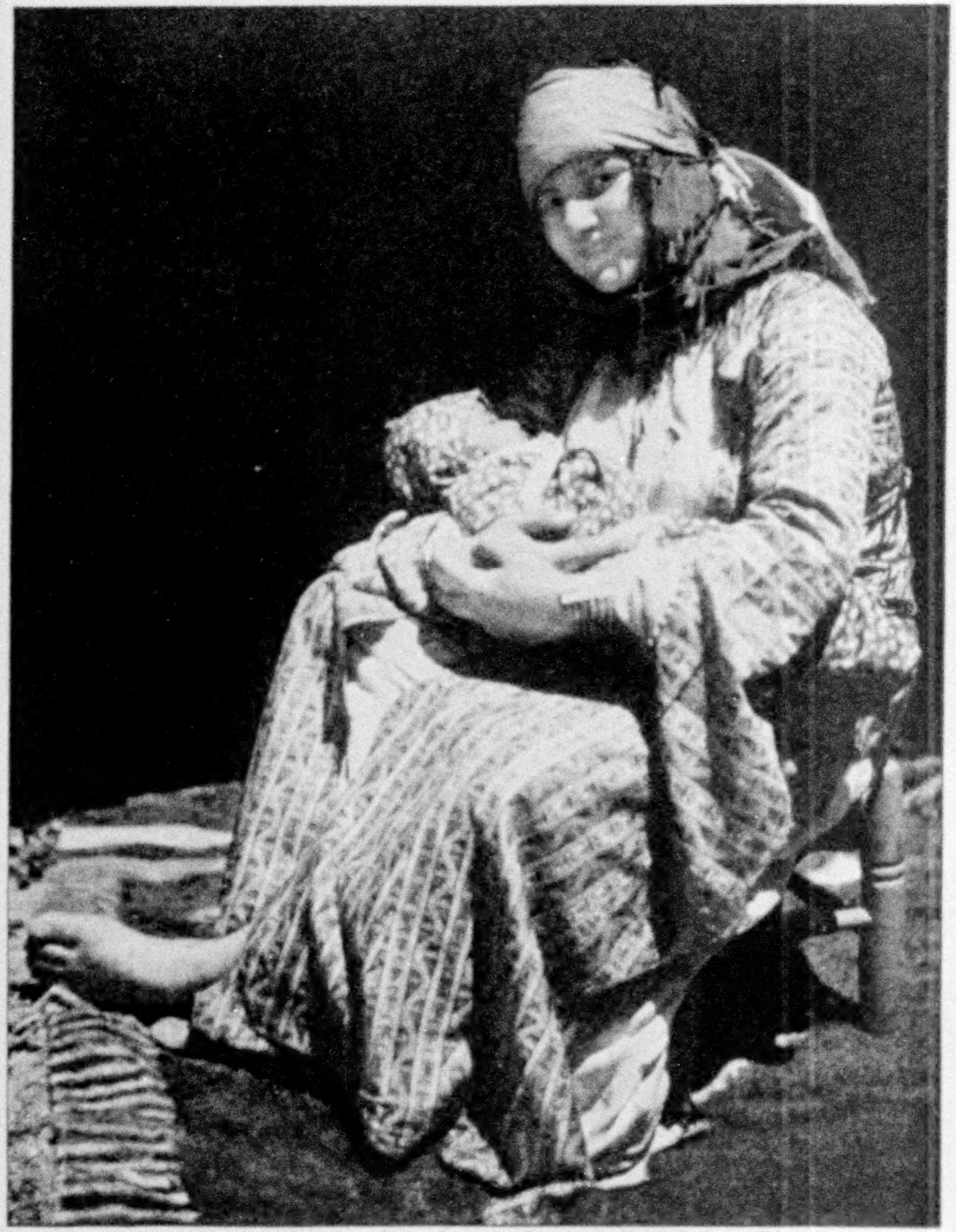
BRIDES CARRY THEIR DOWRIES ON THEIR HEADS

These wedding caps, loaded with silver and gold coins, often weigh so much that it is difficult to conceive how the women endure them. They are kept on day and night, because if they are removed for long their wearers suffer from headache (see also Color Plate III, left).



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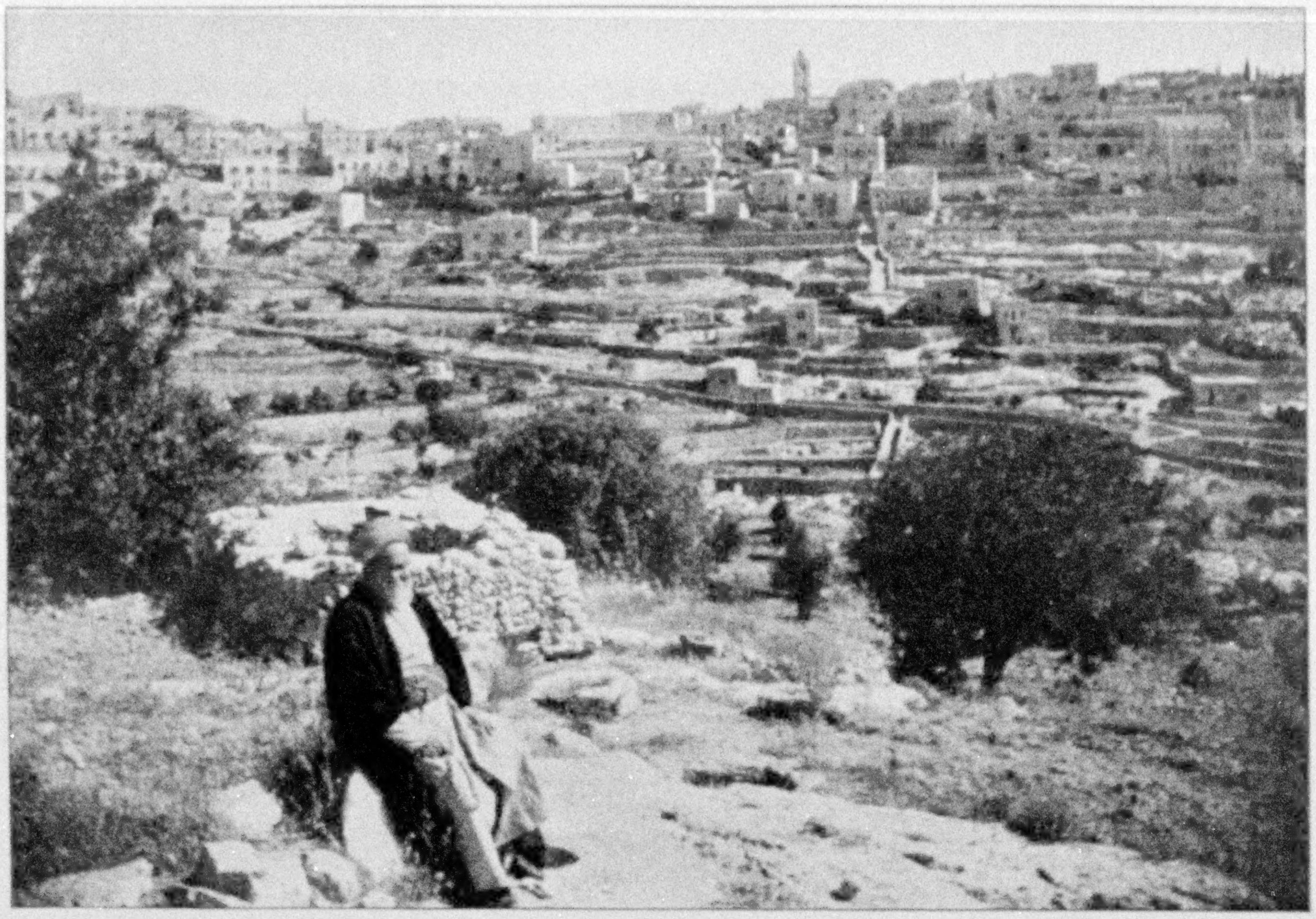
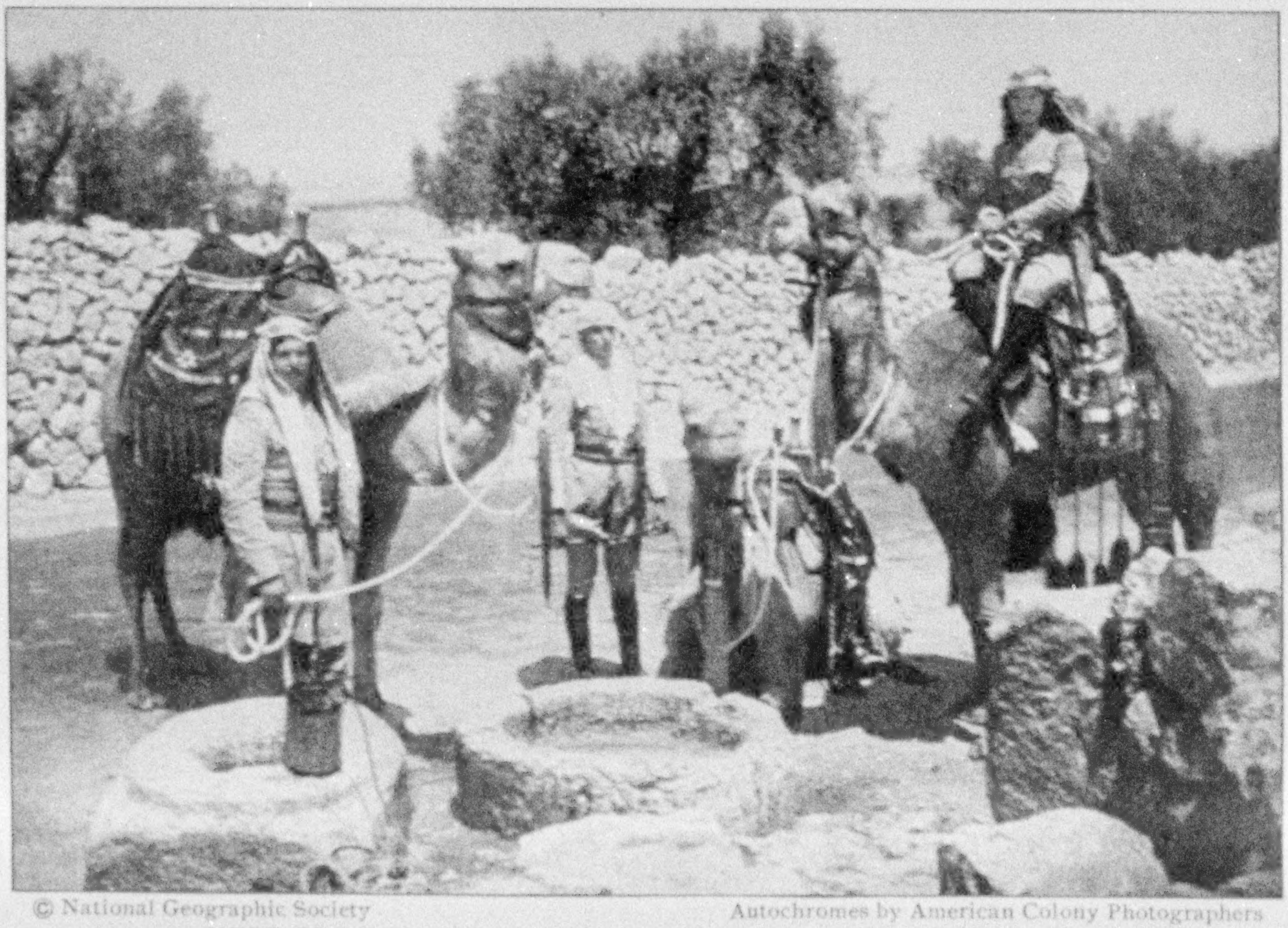
THE NAZARETH GIRL PRIZES HER MOTHER'S GOWN

This young woman's dress is a *fustan*, an heirloom reminiscent of an old-time wedding. It was woven in Damascus perhaps 100 years ago, of silver and gold thread. Garments of this type are rare, for most of them have been sold to jewelers for the precious metals they contain.



FROM THE SOUTH BETHLEHEM APPEARS IN UNSPOILED ANTIQUITY

Here is shown the oldest section of the town, dominated by the belfry of the Church of the Nativity, which thrusts up on the skyline. The view is unusual, for most visitors enter from the north or west.



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HERE THE THREE WISE MEN HALTED TO WATER THEIR CAMELS

Legend calls this cistern beside the road leading from the east to Bethlehem the Well of the Magi. In its crystal depths, it is believed, was mirrored the star that shone above the Christ Child's manger. The men with the dromedaries are members of the British desert border patrol.

son and saying to his servants, "Go ye therefore into the highways, and as many as ye shall find, bid to the marriage" (Matt. XXII: 9).

Crossing the village square, the procession made its way toward the Church of the Nativity, for to be married in this basilica is still considered a rare privilege. It is one of the oldest existing churches in Christendom, if not the oldest, one of the few used in common by the three Eastern denominations and revered by all sects of Christianity. The best authorities doubt not that it stands on or close to the site where Jesus was born and the place of the First Christmas.

Built A. D. 330 by the Emperor Constantine and added to by Justinian, it became in the fifth century the home of St. Jerome, who here translated the Old Testament from the Hebrew. Since that time it has gone through many vicissitudes and restorations.

From each street or alleyway more crowds poured out to get a glimpse of the bride or shower her and the party with attar of roses. All the main streets of Bethlehem lead to the market place fronting the church. Under this village square, the civic center of the town, are extensive rock-cut cisterns with stone troughs surrounding their openings; and the natives still lead their animals here at the noon hour and draw water for them, as they have done for centuries.

SIMPLICITY MARKS THE INTERIOR OF THE NATIVITY CHURCH

The present entrance to the Nativity Church is so small that in passing through it one must bend very low. It is closed by a heavily sheathed, iron-studded door. Since but one person could enter at a time, those of us who formed the rear guard had to wait outside. We used the time to examine the old façade. The original entrance must have been an imposing one, for over the present miniature door is a large portal that repeatedly through the ages has been made smaller (see page 702).

Stooping to enter, we came into an interior of great simplicity, where, between the two double rows of pinkish limestone monolith pillars, said to have been brought from the ruins of the Temple of Jerusalem, the priest with swinging silver incense-burners met the bride and bridegroom. Above the supporting columns we saw the old wooden roof, the gift of Edward the Fourth and Philip of Burgundy. About the walls, scattered patches of gold and colored Byzantine mosaics, contrasting with the white plaster that was filled in as portions of the mosaics dropped off, caught our attention. Particularly interesting was a fragment depicting a row of half figures intended to be portraits of the ancestry of Joseph.

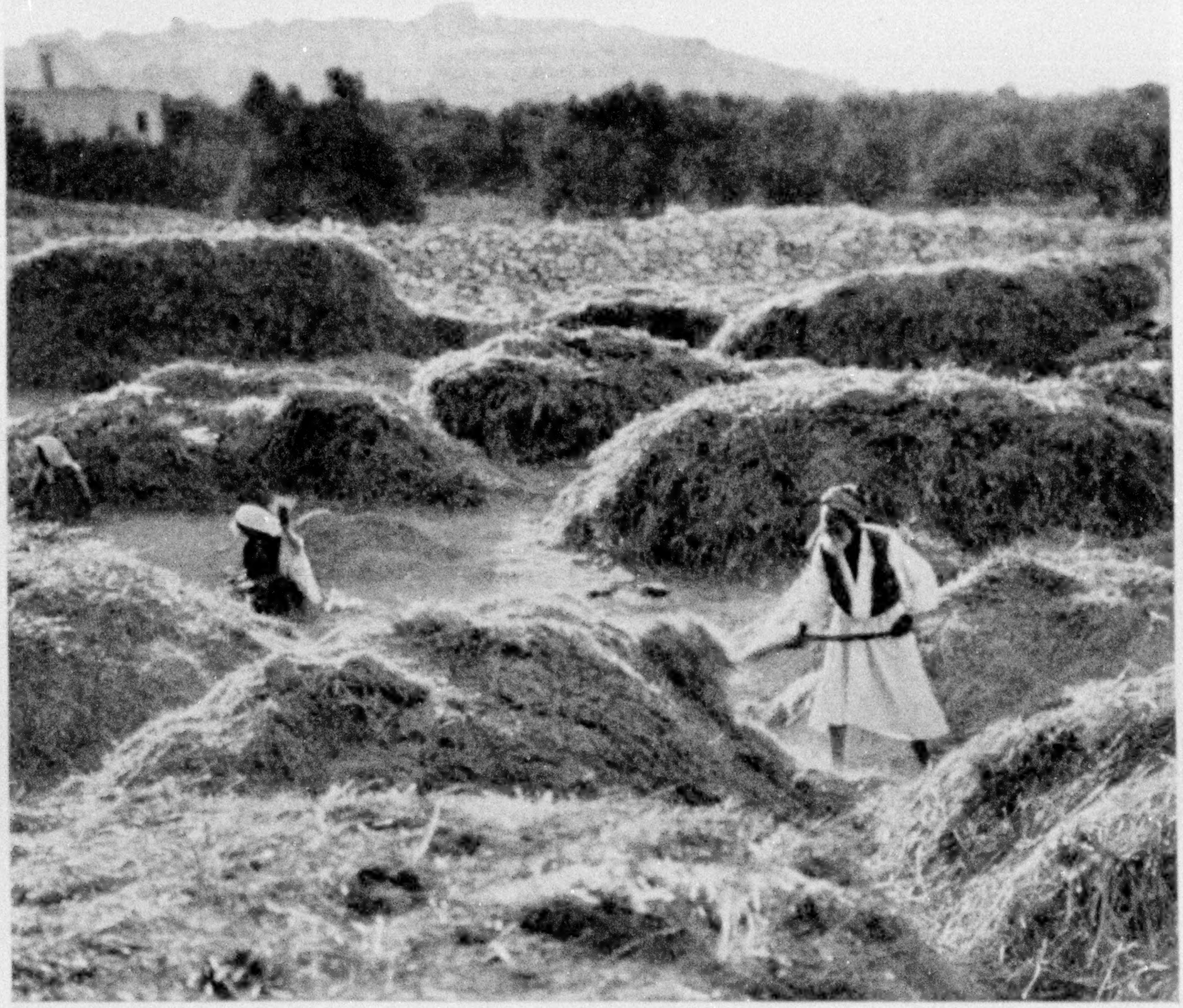
A pretty story is still told by the Bethlehemites, which, though it lacks historic backing, may account for the sparing of this church when the hordes of the ruthless Persian Chosroes burned and destroyed all the other churches in Palestine, including the Church of the Holy Sepulcher in Jerusalem.

It is said that among the earliest mosaics over the main entrance within was a large panel representing the Magi making rich offerings to the Infant Jesus. Seeing this, and recognizing by the costumes that the Three Wise Men were Persians, the vandal hordes spared the church.

Beyond the nave through which we entered we saw the elevated transept, and in front a high altar separated from the choir by a carved and gilded screen. To this altar the bridal pair had been led. Below the transept a chamber, part cave, part masonry, was pointed out to us as the birthplace of Jesus. A silver star attached to the flagstones of the floor in this crypt marks the spot where supposedly the birth took place, and across the room is an altar where the manger cradle is thought to have stood. Such semicave dwellings are still in daily use in Bethlehem (see page 719).

The smallness of the church door had so delayed the entrance that when the last of the procession had managed to pass through, the marriage service was almost at an end. Mumbled in classic Arabic, the words of the priest were intelligible to very few of the guests.

The service throughout lacked the drilled precision of an American wedding. Disturbing noises were the footsteps of those still coming in, the bustle of others carrying the burden of affairs, the merry voices of children, and the whispers of the elders.



WINNOWING IS A TASK FOR THE MASTER OF THE HARVEST

At the close of day, when the laborers have gone to their homes in the village, or in the early morning, before they have returned to the fields, the owner may be found at the threshing floor tossing the trodden sheaves with a simple wooden fork, in order that the wind may separate the chaff from the grain. The woman at the left is a member of the household. She is either loosening the heaps of wheat for the next day or gathering straw for basketwork.

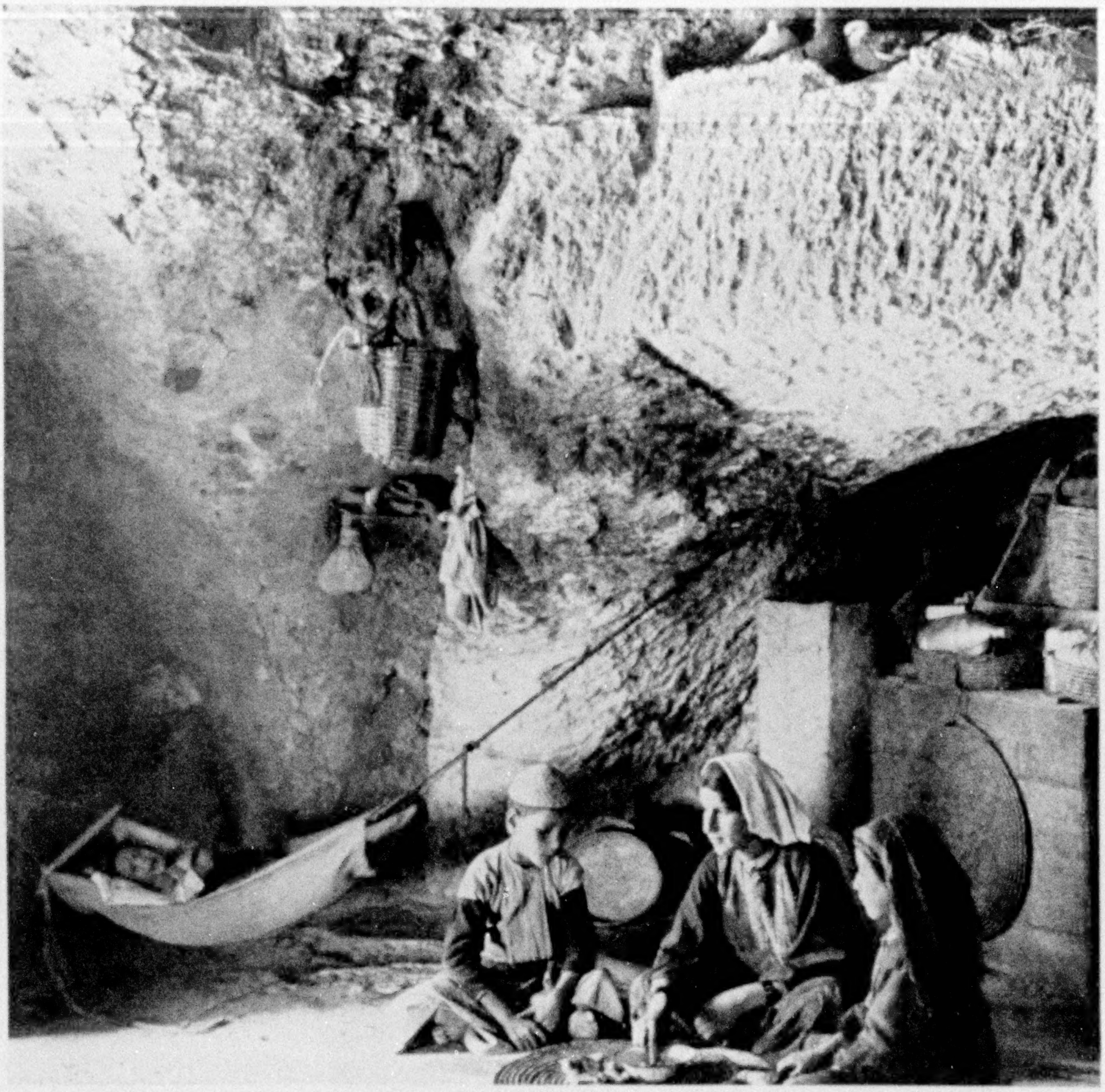
Nevertheless a sense of solemnity and deep reverence pervaded this house of prayer.

Each patriarch removed his great turbaned headgear, revealing a white skullcap, while all the young men stood bareheaded. The women, following the letter of the Apostle Paul's injunction, scrupulously secreted every lock of hair beneath the cover veil (1 Cor. xi: 13).

Through the lofty windows, into the subdued light of the interior, poured shafts of the sun's rays, as if with intent to gladden and brighten the already gorgeously clad and happy assemblage and to rival the flicker of scores of tapers carried in the procession (see page 720).

BETHLEHEMITES ARE DESCENDANTS OF CRUSADERS

This marriage scene brought vividly to mind one of historic importance that took place here when, on Christmas Day, A. D. 1100, Baldwin I was crowned king of Jerusalem. The Bethlehemites lay claim to being descendants of the Crusaders. The fair skin, the blue eyes, the rosy cheeks, noticeably among the maidens of



JESUS WAS BORN IN A HOME LIKE THIS

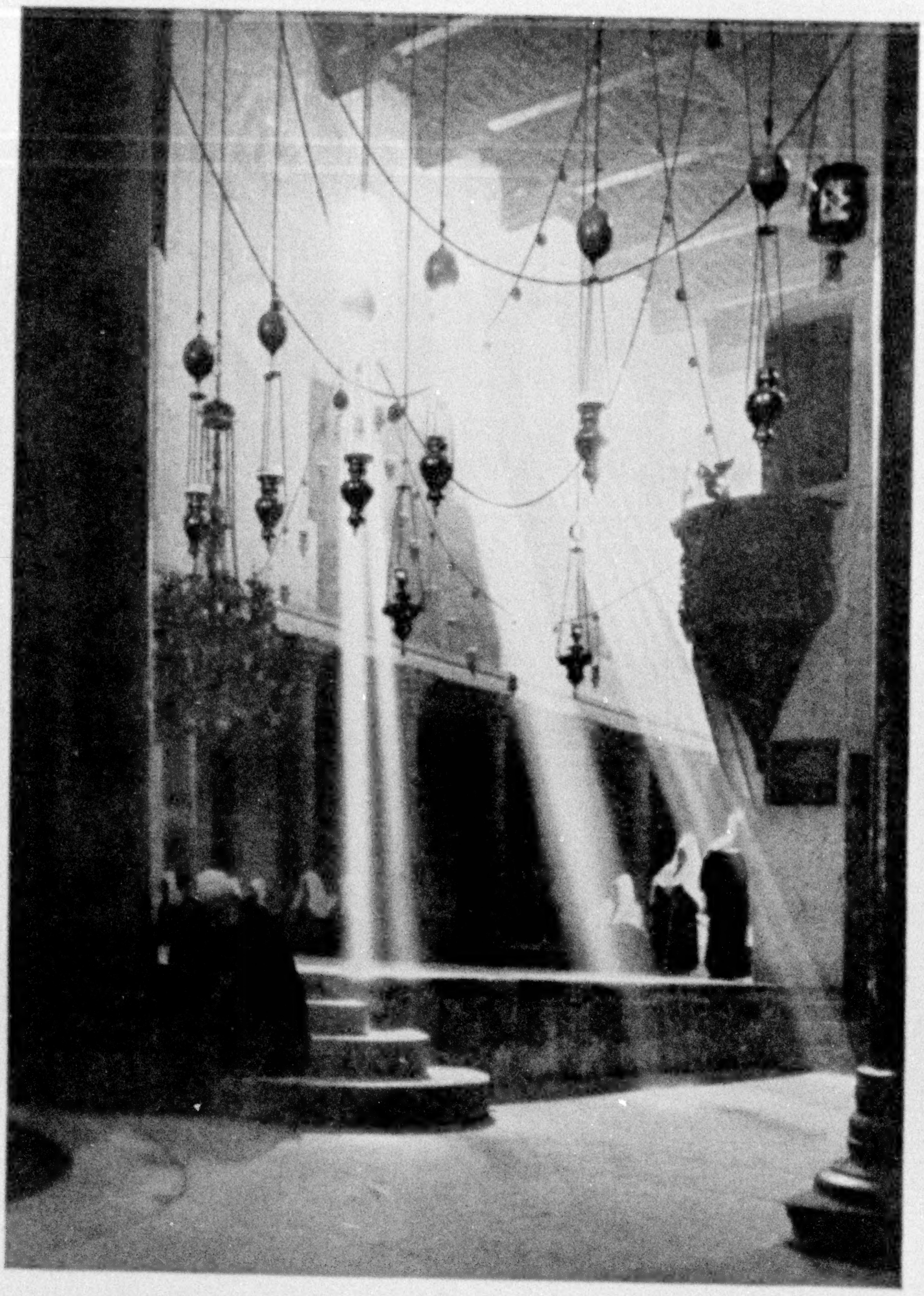
Built against the side of the mountain, the house is part masonry, part cave hewn into the soft rock (see text, page 727). The three children are eating a frugal meal, dipping morsels of bread into a common bowl, while their baby brother or sister sleeps in the low hammock near them and doves coo in the crannied wall above. Beyond the raised floor upon which they sit is the stable with its stone mangers (see, also, text, page 730).

the higher classes, seem to substantiate this assertion.

When the bridal pair reached home and were about to set foot into the domed entrance hall, there burst out suddenly a roar of firearms which startled the foreign guests, but greatly delighted the natives. The bridegroom's father and three brothers had drawn six-shooters from their hip pockets and emptied the barrels into the ceiling. Piercing the plaster and lodging in the stone arch, the bullets left deep scars in the frescoes as lasting mementoes of happy days.

This shooting is reminiscent of a Bedouin and possibly a primitive-man custom. In the old days, when an enemy camp had been raided and a bride captured, or, more often, when a bride was brought safely from her father's tent through enemy country, triumphant volleys were fired to celebrate the driving away of the pursuers.

At the home the entertainment continued with much mirth, and dancing of a sort strange to occidental eyes. The mother, sisters, and other relatives danced solos before the bridal pair. These num-



GOLDEN SUNLIGHT GLORIFIES ONE OF THE OLDEST CHURCHES IN CHRISTENDOM

Women are praying on the raised platform over the Grotto of the Nativity, where the wedding described by the author on page 717 was solemnized. Silver lamps hang from the ceiling. The globular objects below which swing the bowls of burning olive oil are ostrich eggs, either natural and metal-mounted or made of faïence decorated with crosses and cupids in colors. These ornaments prevent mice from running down the chains and getting into the oil, and also remind worshipers to attend the sermon as vigilantly as the ostrich is believed to watch its nest.

bers were varied occasionally by a man and woman dancing in unison but apart, the movement being not so much a step as a rhythm of the body and arms, depicting in perfect harmony and time sword-wielding and other warlike gestures, survivals of days of chivalry, when self-protection was the only law of the land.

Accompanying the dancing, the singing women would call out their shrill warbling notes, hard to explain and harder to produce by any but the initiated; then into the tune they would sing words composed impromptu, extolling the virtues of the bride and magnifying the manly characteristics of the bridegroom. The scene reminded one of the reception of David when he was returning from the slaughter of the Philistines, and the women came out singing and dancing and said, "Saul hath slain his thousands and David his ten thousands" (I Sam. XVIII: 6, 7).

The wedding party disbanded that night, but only after the last flicker of human energy had been expended.

A PILGRIMAGE TO BETHLEHEM

To-day the pilgrims and visitors, as well as the natives, enjoy a quick run from Jerusalem to Bethlehem over a smooth, dustless road in modern cars; still it is pleasant, in thinking of the First Christmas, to let memory carry one back, as I can, to days when there were no vehicles of any kind to mar an ancient setting, when camel and donkey trails and footpaths were the only highways.

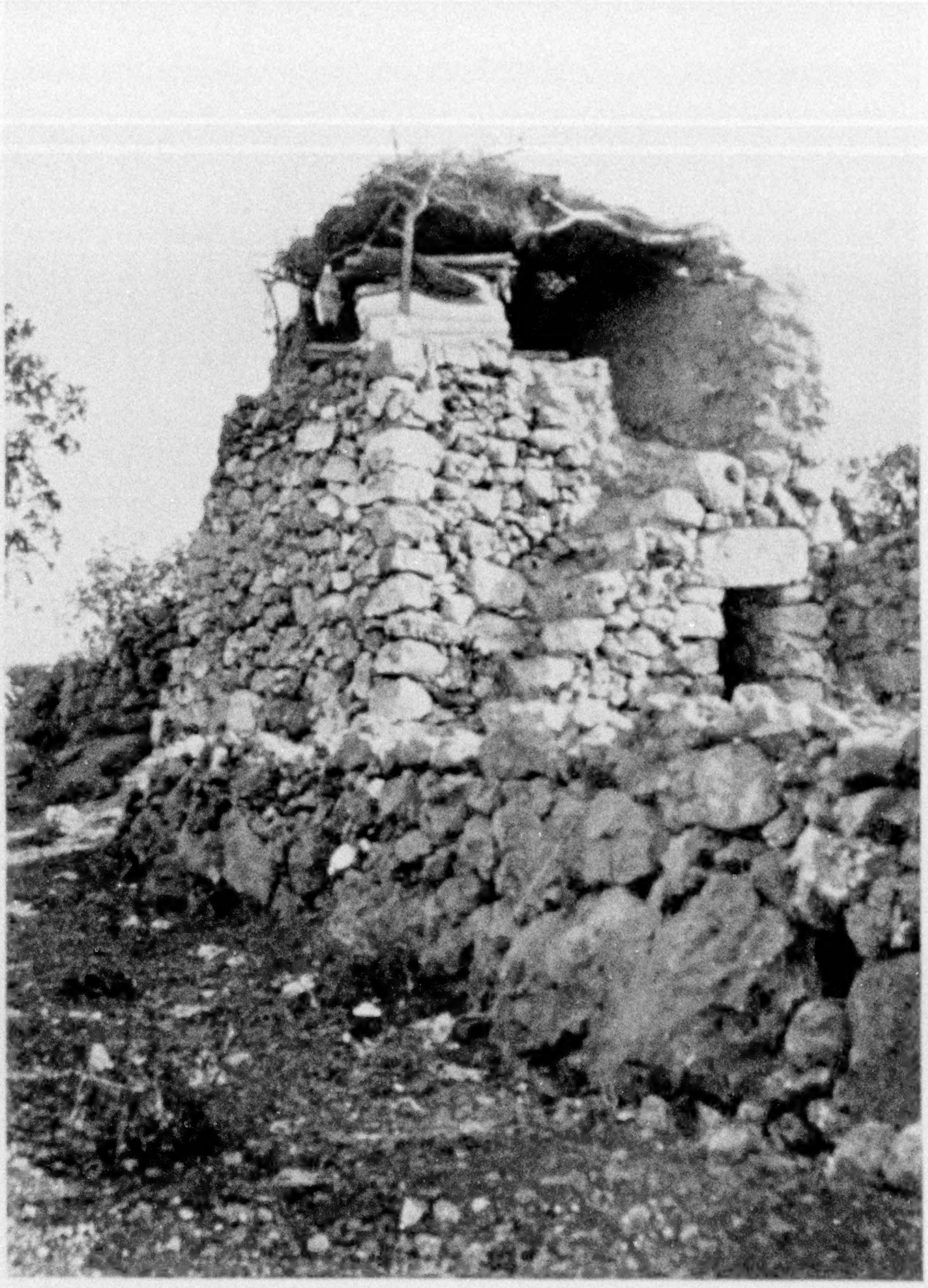
Leaving Jerusalem, with its encircling wall, towers, and bulwarks behind, the traveler crosses the plain of Rephaim and starts a gradual ascent. From the top of this hill he catches his first glimpse of Bethlehem, called *Beit Lahm*, "The House of Bread," by the ancients because of the fertility of its fields.

By the roadside at the foot of the hill is a large old cistern with twin openings from which to draw water. One of these openings is topped by a section of conduit built by the Roman Procurator, Pontius Pilate, to supply Jerusalem with water.* Between the cistern tops is a circular stone trough. One can scarcely pass during the noontide hours of a hot summer day without finding many flocks being watered at this well, and sometimes long strings of camels stop here to quench their thirst.

While this cistern has no historic background, a pretty legend hangs to it. It is known as the "Well of the Magi." Supposedly the Three Wise Men halted here to water their camels on the night when they were on their way to Bethlehem, seeking "Him who is born King of the Jews" (Matt. ii: 2).

They were weary and worn, and Herod's injunction to let him know when they discovered the Christ Child was troubling them. They knew not how near they were to their goal, for Bethlehem was hidden from them by the little hill beyond. Leaning over the well's mouth to draw water, they saw to their delight the reflection of the star which they had seen in the East and which now was to lead them to the manger cradle.

The swift *hajin,* or riding camels, such as the Magi are usually pictured riding, are now rarely seen in these parts, for they are the desert mounts. Far out on the eastern boundaries of this mandated territory, where the desert meets Moab, the British have a strong and well-equipped camel corps. It was my good fortune, while I was wandering about one day on the way to Bethlehem, to obtain a picture of three men of the East watering their camels at this old well (see Color Plate VIII). Though their attire is somewhat



EVERY VINEYARD HAS ITS WATCHTOWER

During the heat of the day the members of the family live in the lower room, where the provisions are stored, and a solitary watcher, often a woman or child, keeps lookout in the bower-covered arbor atop the structure. At night the upper floor serves as sleeping quarters for all save the father, who makes occasional rounds of his property to drive away foxes or other marauders. Such rude buildings of field stones are the summer homes of the Bethlehemites (see text, page 730).

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* See "An Old Jewel in the Proper Setting," by Charles W. Whitehair, in the NATIONAL GEOGRAPHIC MAGAZINE for October, 1918.

THOUSANDS OF YEARS OF USAGE HAVE WORN THIS MOUNTAIN TRAIL

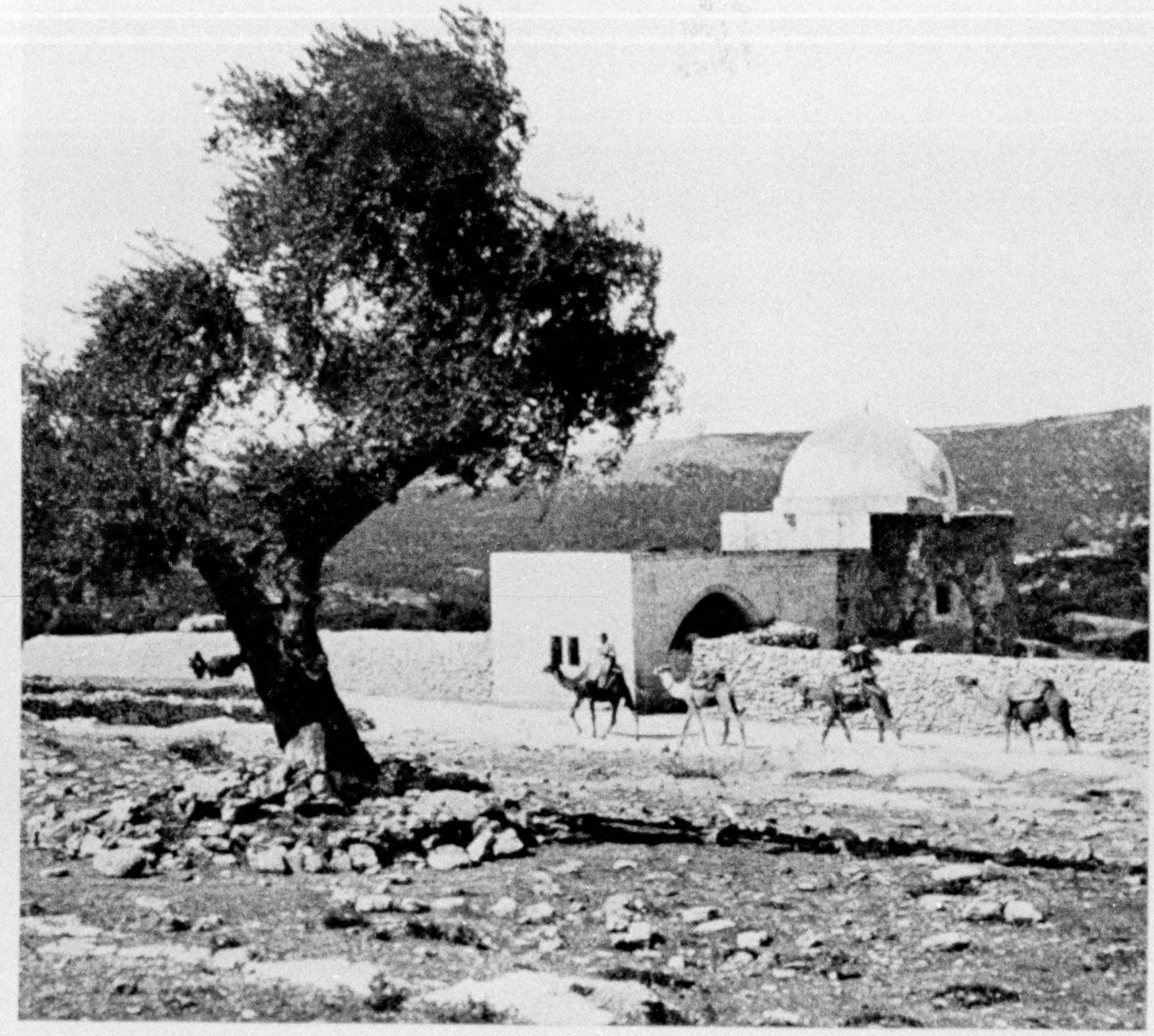
Over the very road by which the two women are climbing toward Bethlehem, the shepherds of the First Christmas made their way in search of the Manger Child. It is the custom of carrying water jars and other heavy burdens balanced on the head that gives girls of Palestine their stately bearing.

modern and they may have no claim to special wisdom, they reminded me of the "Three Wise Men of the East" (Matt. II: 1) and of the First Christmas.

The hill drops away rather abruptly, once one tops the ascent, and Bethlehem, perched in a unique position geographically, bursts into view. To the east is an open valley, a huge amphitheater in the mountains. Into this the hill of Bethlehem thrusts itself, towering above the valley on the north, east, and south. On the west, although connected with the adjoining country, it lifts its crown above the surrounding hills and mountain tops.

Every inch of these steep sides is cut with terraces, many only wide enough to admit of planting a single row of trees, with perhaps a few grapevines hanging over the terrace walls. Olives, figs, pomegranates, and grapes cover these slopes, and at the base nestles the Shepherds' Village, a sort of farming outpost of Bethlehem.

To the east of this village opens up the fertile farm land in the valley bottom. As harvest time nears, it is a veritable patchwork of color, with wheat still a rich, deep green; barley a lighter green, with the yellowish tinge setting in; lentils,



MOSLEM, JEW, AND CHRISTIAN REVERE THE SPOT WHERE RACHEL IS BURIED

About this tomb, beside the road that connects Jerusalem with Bethlehem and the more distant Hebron, lies a Mohammedan cemetery, but the keys to the sanctuary are kept by the Hebrews. Here worshipers of three religions come to pray. The hills of Judah are seen in the background (see text, page 725).

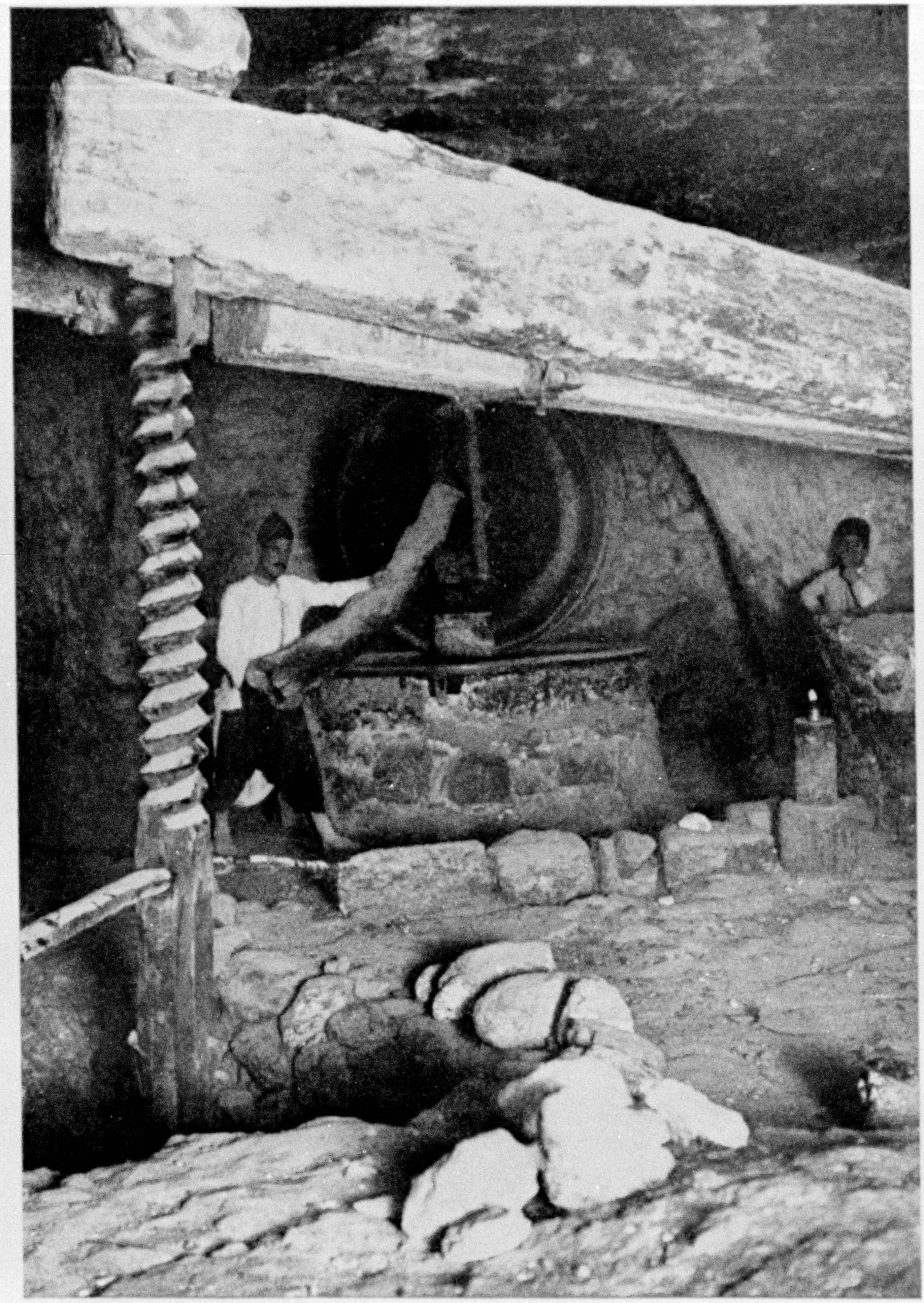
spelts, and pulse turning into many shades of tan and yellow, as the time of their gathering approaches.

Seen from above Bethlehem, these fertile fields blend with the Desert of Judea, the Desert of the Scapegoat, described in Leviticus XVI: 8, 9, 10. The great expanse of arid waste drops abruptly into the Dead Sea, but the waters, 1,300 feet below sea level, are mostly hidden from view by hillocks and mountain ranges rising above its precipitous shore.

Beyond this salt lake to the north is the Jordan Valley, the course of the river outlined by a fringe of green, the green of tamarisk and poplar. The limit of the view eastward is the irregular Range of Moab, blue and seemingly transparent as a sapphire in the setting sun (see Color Plate V).

HISTORIC SITES ABOUND NEAR BETHLEHEM

All about cluster numerous historical sites, where important scenes of the past were enacted, and the history, interlocking, seems to lead up to and culminate in the First Christmas. It seems fitting to consider these places in the chronological order of the events with which they are associated.



IN A DARK ROCK CAVE AN ANCIENT OLIVE PRESS STILL FUNCTIONS

To the beam behind which the youth stands, a mule or camel is hitched when the millstone is to be rotated. The hand-hewn screw at the left, turned by the lever thrust into its base, lets down the weight of the enormous oaken beam to squeeze the oil out of the crushed fruit. The flickering lamp on the stone stand in front of the boy at the right furnishes the only illumination (see text, page 727).

Where the road to Bethlehem forks off to Hebron, there stands by the wayside a picturesque little dome, the unpretentious tomb of Rachel, favorite wife of Jacob. The spot is mentioned in Genesis XXXV: 16-20: "And they journeyed. . . . And there was but a little way to come to Ephratha. . . . And Rachel died and was buried on the way to Ephratha, which is Bethlehem, and Jacob set up a pillar upon her grave" (see page 723).

A half day's walk from the tomb of Rachel is Hebron, in the Vale of Mamre. Here the Patriarchs pitched their tents while they were wanderers in the Promised Land. When in Egypt and of a great age, Jacob gave a charge: "I am to be gathered unto my people. Bury me with my fathers in the cave that is in the field of Machpelah, which is before Mamre. . . . There they buried Abraham and Sarah his wife; there they buried Isaac and Rebekah his wife; and there I buried Leah" (Gen. XLIX: 29-31).

Here, in Hebron, lies Machpelah, surrounded by a Cyclopean wall built of mammoth, finely-drafted stones of herodian period and workmanship, within a Moslem mosque that once was a church, erected by the Franks in 1167. Below is the burial cave itself, unopened, so far as historical documents record, since the Crusades.

Until the British occupation, entrance to the inclosure was denied to all but Moslems, only three parties of notables having gained admission through special favor of the Sublime Porte at Constantinople. King Edward, when he was Prince of Wales, was the first to enter. Emperor Franz Josef was the second visitor; and the Hon. Henry Morgenthau, while he was United States Ambassador to Turkey, was the third. The present writer accompanied the ambassador as American vice-consul and interpreter of the Arabic language. Hebron to-day is called *Khalil el Ruhman*, "The Friend of God," a name applied to Abraham in both the Old and New Testaments (II Chron. XX: 7, and James II: 23).

The Range of Moab, seen from Bethlehem, entrances the visitor. When the sun is rising over it, or when its summits, glowing with the reflected evening light, seem to be lit up from within, and are now an opalescent blue, now a rose pink, now a violet dying into black with the setting sun, its beauty beggars description. Gazing at it, one wonders which of the many peaks was Nebo and which the Pisgah whence Moses viewed a land he was never to enter (Deut. XXXIV: 1-4). Somewhere in the quiet unknown beyond Jordan is the burial spot of the great lawgiver.

Zigzag paths lead down from Bethlehem to the Shepherds' Village. Between the hamlet and the fields of ripening grain are the threshing floors. Somewhere in this fertile district Boaz, "a mighty man of wealth" (Ruth II: 1), had his fields.

HARVEST GOES ON AS IN THE TIME OF RUTH AND BOAZ

In the fields, the men, with their vivid orange turbans, white garments, and leather aprons, and the women, in their blue linen homespun and white flowing veils, work together, harvesting with the sickle. They cut the grain, small handfuls at a time, wrap each sheaf with a few straws, and cast it aside for another. Among the sheaves a less fortunate widow or orphaned daughter may be seen gleaning that which has been dropped by the reapers. The fields from which the sheaves have been removed the shepherds have invaded with their flocks.

Where the reapers are many, an estate owner stands, giving directions and encouraging by kind words. Harvesting thus with a simple sickle from early dawn through the greatest heat of the day until dark is the hardest work the peasants of Palestine have to perform; but they seem most joyous. They sing as they work. The passer-by calls out, "May Allah give you strength!" They reply, "May Allah preserve thee!" In such surroundings, the imagination has not far to run to reconstruct the historical picture of Boaz and Ruth the gleaner (see pages 705-707).

Camels carry the grain from the fields to the threshing floors. As the reaping proceeds, these floors are slowly stacked high with sheaves; then, when the harvest is over, the women and children, during the heat of the day, when the straw is brittle, drive shod cattle over the heaps. When trodden into fine chaff, the straw is forked by the men into a neat pile. At night the workers return to the village—all save the modern Boaz, who waits for

SHEEP KNOW THEIR OWN SHEPHERD

In the early morning, when the night vigils are over, the men start off with their flocks, each in a different direction. Though the calls sound exactly alike to the uninitiated, the animals never mistake their master's voice or follow a stranger (see John x: 1-15).

the late evening or early morning zephyrs to help him winnow out the grain. When the breezes die out, his work is done and he lies down by the pile of newly separated grain to get his night's rest.

THE GLORY OF HERODIUM NOW IS DUST

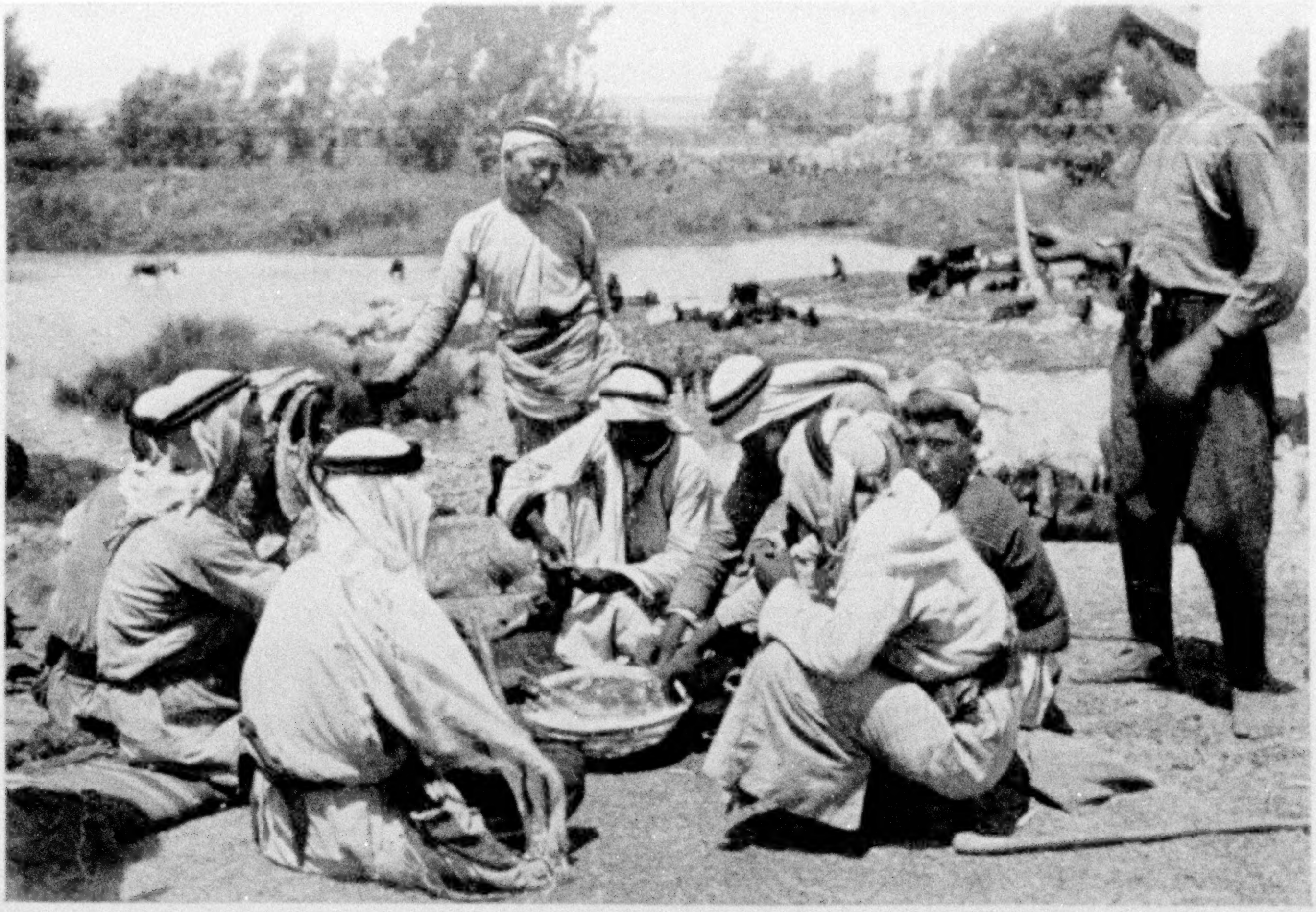
As the visitor turns from these pastoral scenes to let his eyes wander over the panorama spread out before him, a unique mountain in the desert attracts his attention because of its shape and location. It resembles in form an extinct crater. Its Arabic name is *Jabal el Fureidis,* "The Mountain of Paradise"—a name not well befitting its present state (see Color Plate V).

Here was a natural hill, which Herod the Great heightened by artificial means to make a fitting site for his castle. Human energy meant nothing to this cruel monarch. Slaves labored in an agony of toil while water was brought by a conduit from a distant spring to fill a large masonry reservoir at the base of the mountain, and a wide flight of steps was constructed leading up to the castle with its four towers.

The palace of Herodium was one of the many structures that this Herod built and embellished. He converted the desert here into a veritable Paradise. The historian Josephus gives an adequate description of this palace that is fully confirmed by what is left of its ruins.

The top of this oasis castle must have provided a superb view. Bethlehem, the Dead Sea, the Range of Moab, and great stretches of desert lie about it in cyclorama. Undoubtedly it was the strategic position of the spot that caused Herod to expend so much to reclaim it from the wilderness.

The statement, "Jesus was born in Bethlehem of Judea in the days of Herod the king" (Matt. II: 1), acquires new meaning to one who realizes how near Bethlehem was to this palace. It was this very Herod who caused to be slain the babes in Bethlehem in an effort to end the life of the Manger Child. Herod, it is recorded, died in Jericho, and his body



DESERT SHEPHERDS COME TOGETHER FOR THE MIDDAY MEAL

It is an ancient custom among the keepers of the flocks to congregate at some stream or fountain to partake in common of the food sent out to them from the villages. They are friendly, hospitable folk.

was brought up and buried in this very mountain. Here the Crusaders offered their last prolonged resistance to the Moslems, from whom it gets its present name, Frank Mountain.

THE DOMED ROOM IS THE CHIEF FEATURE OF THE BETHLEHEM HOME

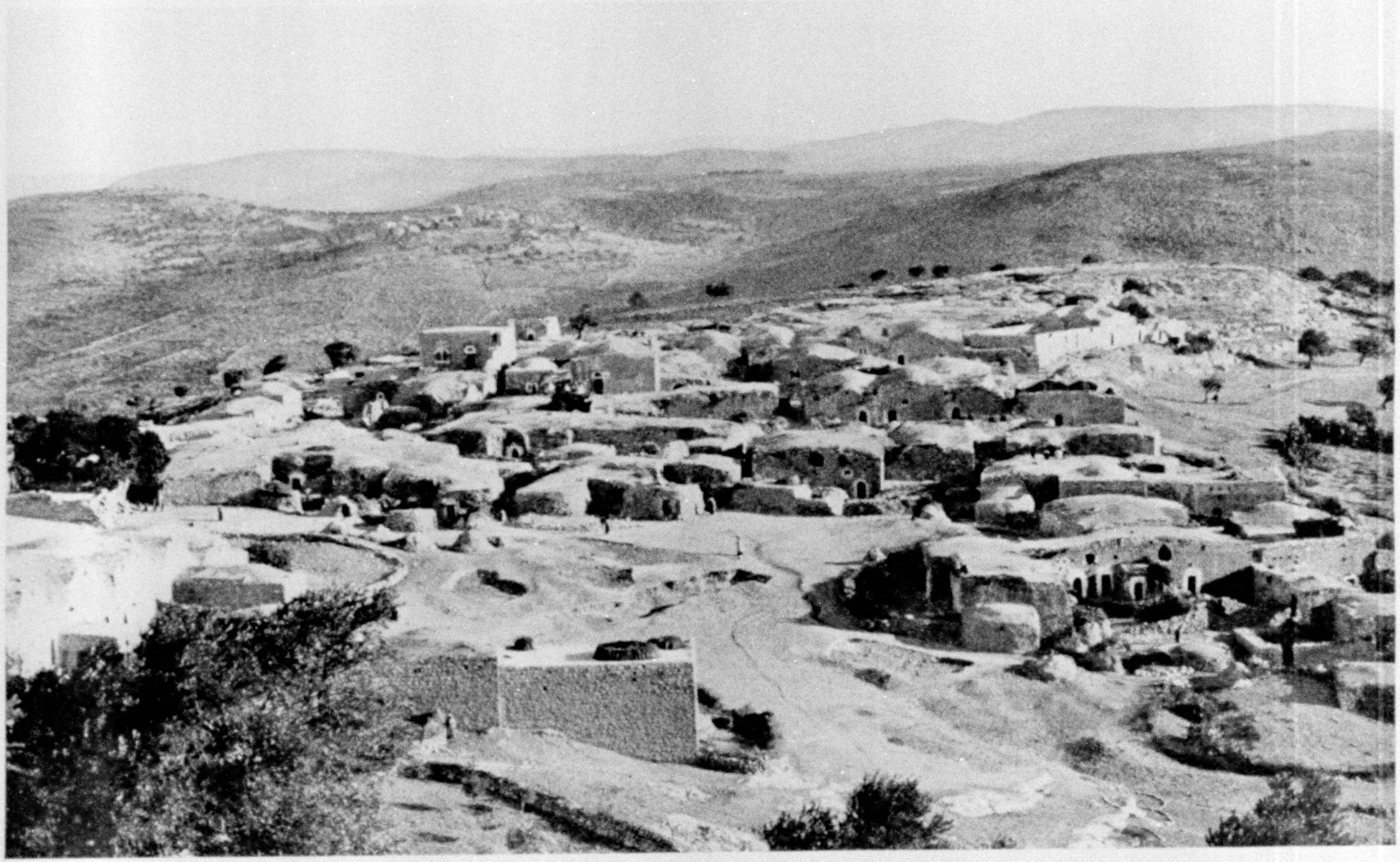
When I visit the Shepherds' Village, the natives gladly offer a view of the interiors of their quaint homes. They describe themselves as very "antiqua," and all have a good laugh over it. Adjoining one home is a large rock cavern, within which is an oil press used during the harvesting of the autumn olive crops. The place is dark, for it is lighted only by clay saucer lamps with wicks fed by olive oil. The entrance is so small that, to turn the oil mill, a mule has to be used instead of a camel, the usual motive power (see page 724).

A home consists of one large domed room. Within, a platform, uplifted on arches, serves as the abode of the family. Below this are the fold of the sheep and the stone mangers. Some of these houses, built against the sides of the steep mountain, are partly caves. They illustrate clearly how the present grotto in the Church of the Nativity at Bethlehem could have been part of a human abode that First Christmas (see page 719).

CHILDREN ARE THE PEASANTS' GREATEST JOY

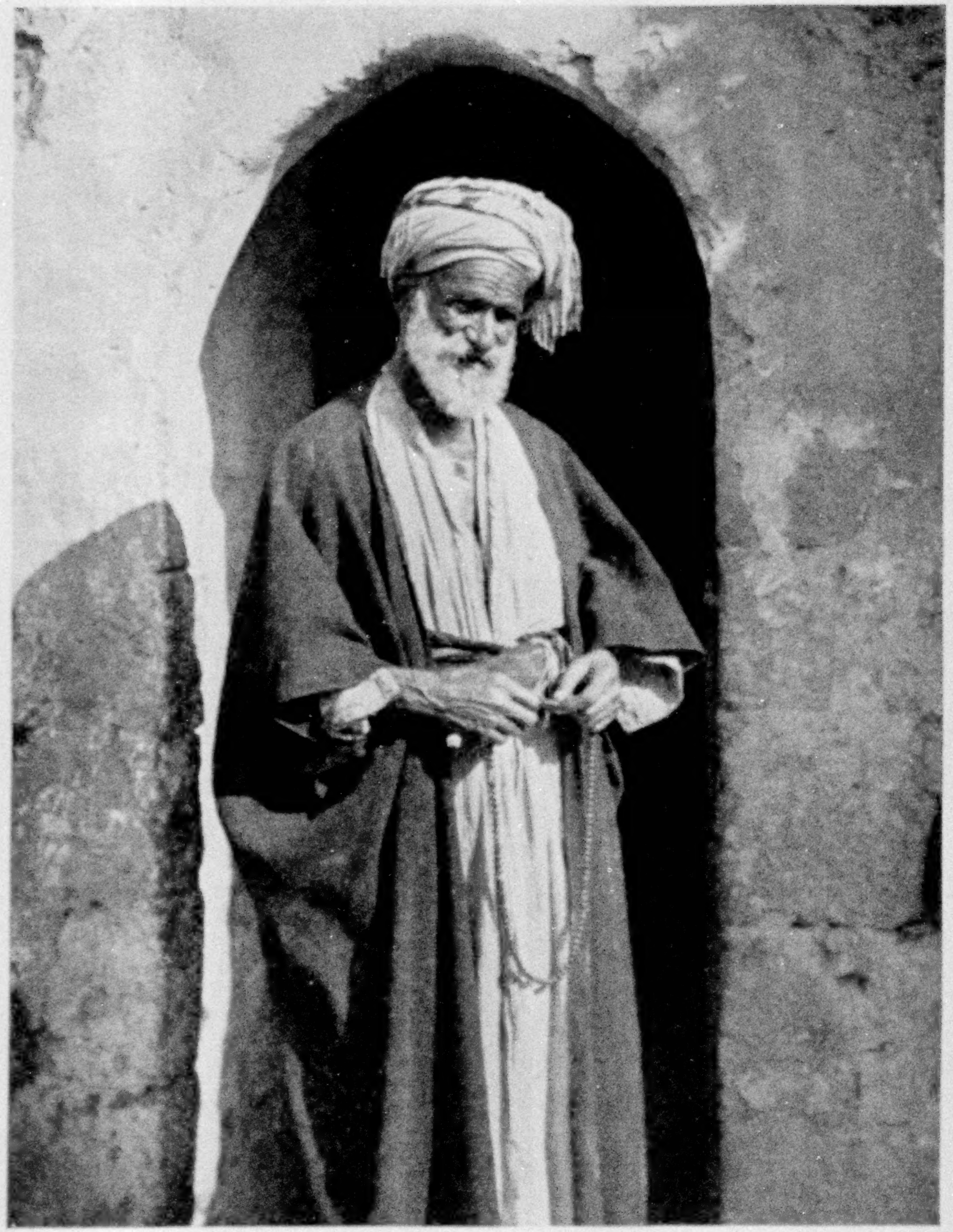
Among these peasant folk, as throughout the Holy Land, all children are loved and boys are especially favored, for the parents believe that "children are an heritage of the Lord, and the fruit of the womb His reward" (Psalm CXXVII : 3). The greatest calamity that can befall a woman is to be barren, and the next not to be the mother of a "man child," to use the Bible phrase (1 Sam 1: 11-16).

When the little one arrives, it is rubbed with salt, and then, with arms tightly pressed against the body, it is wrapped in a swaddling cloth and firmly bound about with winding tape. Babies are kept salted for a week, and swaddled for from four



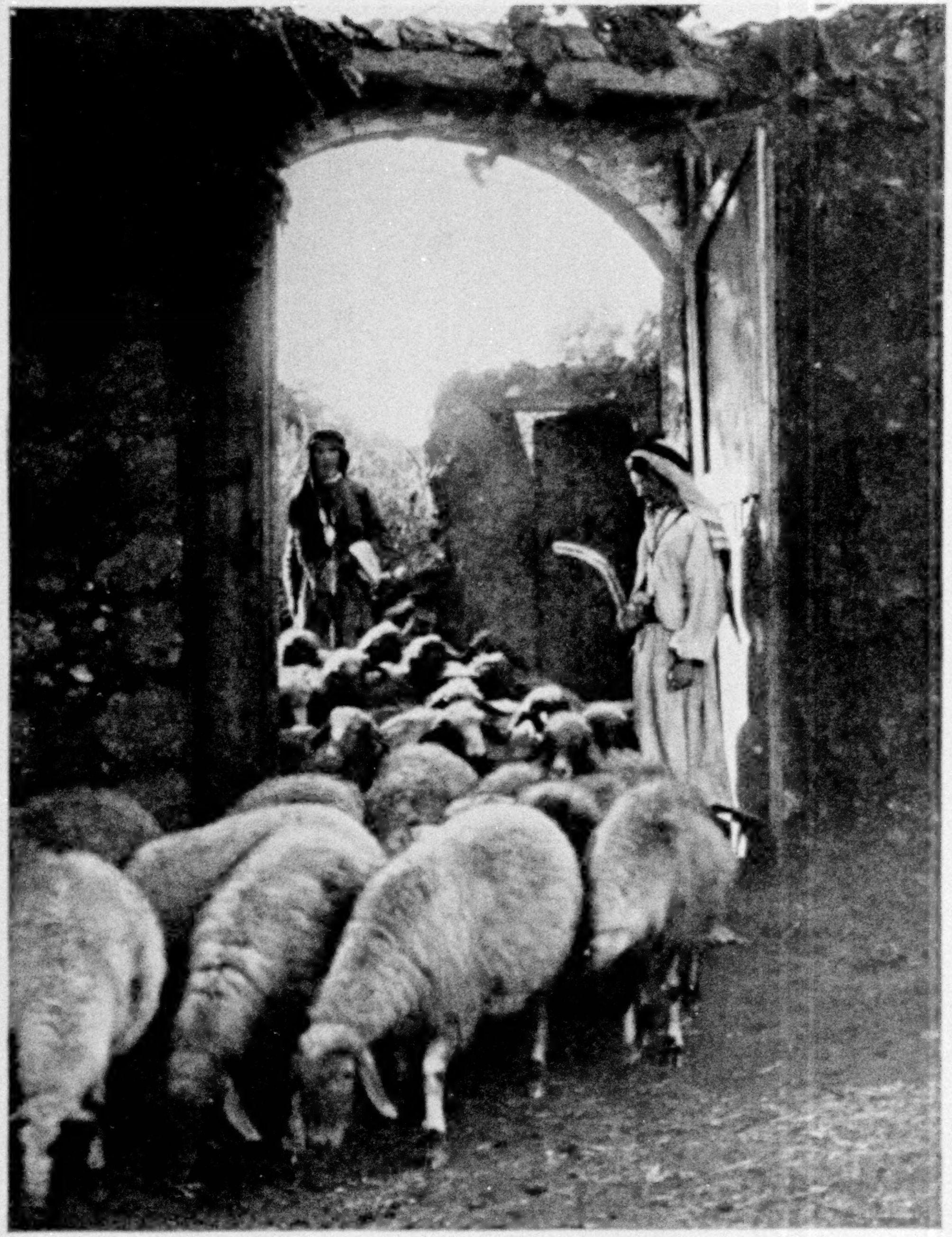
KUFR MALEK IS AN ANCIENT SHEPHERD VILLAGE

Abu Dahoud (see opposite page) and his people live like the patriarchs of David's time, in this little town 20 miles north of Bethlehem. Their homes are all of massive stone construction with flat mud roofs. Because flowing water is plentiful near by, many large flocks are pastured here.



KINDLINESS CHARACTERIZES THE SHEIK OF KUFR MALEK

Though Abu Dahoud is a Mohammedan, he gave the author his first introduction to the Christmas nights with the shepherds. The venerable village chief stands in his doorway telling his Moslem beads.



AS THEY ENTER THE FOLD, SHEEP PASS UNDER THE ROD

This method of counting the flocks dates from the time of Abraham. The shepherd stands at the door and makes note of each animal as it comes in.

LIKE DAVID OF OLD, THE SHEPHERD BOY LEADS HIS FLOCK

In the Wilderness of Judea, near the Jordan Valley, sheep must wander far in search of forage, and for that reason they are less numerous than they were in Biblical times (see text, page 734). Here some are feeding on the dry grass of the desert.

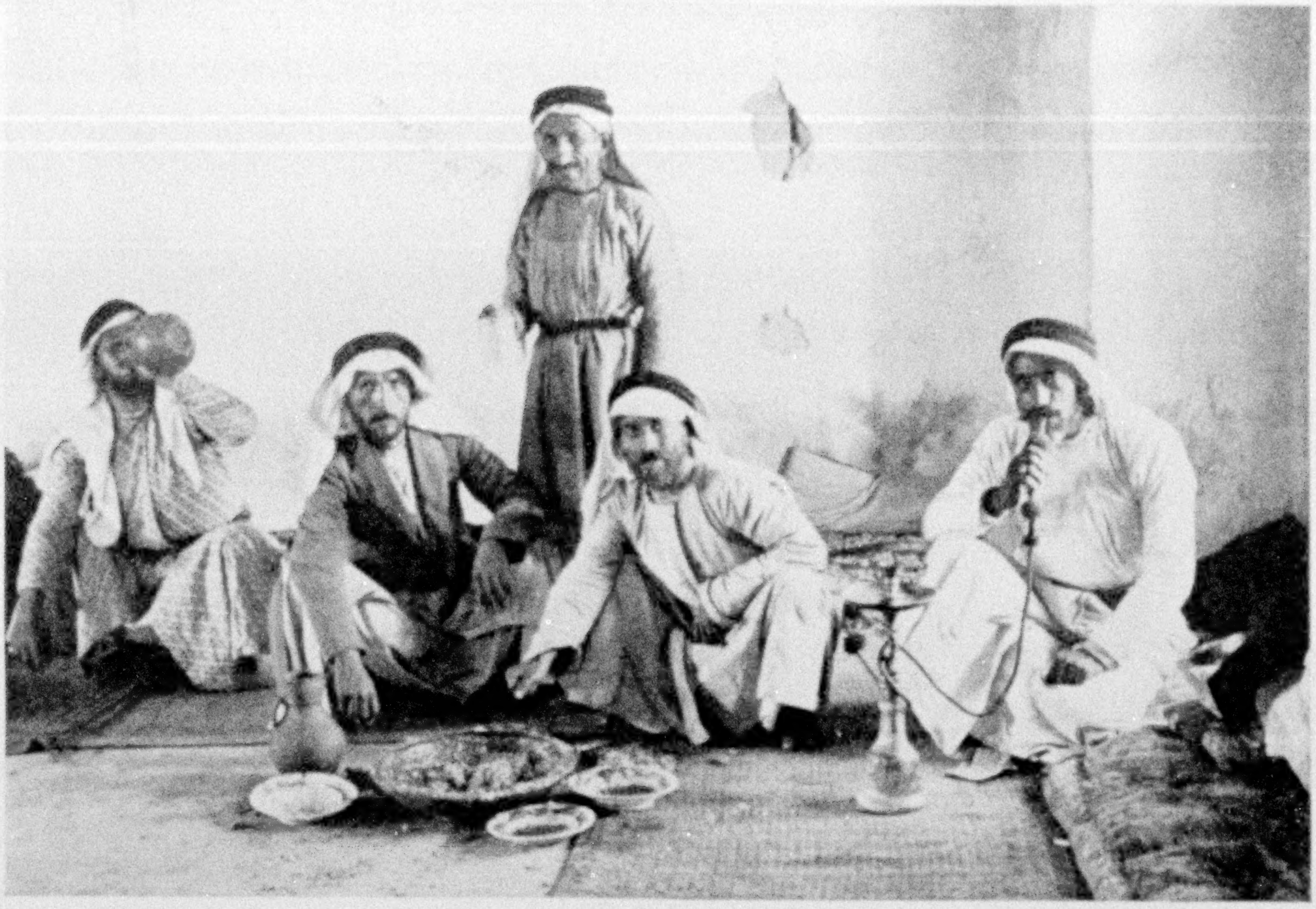
to six months. This Eastern custom explains the meaning, otherwise unintelligible to the Western mind, of Ezekiel's words, "in the day thou wast born thou wast not salted at all, nor swaddled at all" (Ezekiel XVI: 4). This salting and swaddling are supposed to benefit and strengthen the child for life, and none is thought properly cared for if the procedure is omitted.

Mary and Joseph, arriving and finding no room in the village caravansary or inn, were welcomed by just such humble folk as those who now live in the Shepherds' Village, and in a house, part stable, part human abode, Jesus was born, swaddled, and laid in a manger (see page 719).

The prevailing Western idea that Mary and Joseph, when denied admission to the inn, found a refuge in its adjoining stables is unthinkable to any who know the East and the simple but abundant hospitality of its people. Of the Three Wise Men the Gospel chronicler relates that "when they came into the house they saw the young child with Mary his mother" (Matt. II: 11).

On the climb back to Bethlehem from the Shepherds' Village, one has time to notice the terraced vineyards and the fig and olive groves extending from one hill to another over much of the surrounding country. Here the Bethlehemites live in summer when the fruit ripens. In some orchards small houses are built, but most have only watchtowers, simple affairs constructed of field stones. Usually the olives are planted alone, and the vines share the ground, with fig trees, pomegranates, and almonds scattered about in joyous confusion. Around all is a low wall built of loose stones. In some of these vineyards ancient Hebrew presses are still in good preservation. They are cut in the rock—large shallow vats, in which the grape clusters were trodden by human feet. The juice runs into a settling basin, whence it is dipped into "bottles" newly tanned from goatskins (Luke v: 37).

These vineyards are just as they were when Jesus spoke his parable, "A certain man planted a vineyard, and set an hedge



EACH VILLAGE HAS ITS GUEST CHAMBER

As in the days when Jesus bade his disciples to serve the Passover meal in the upper room (Mark XIV: 14-15), Abu Dahoud, chief of the village of Kufr Malek, entertains visitors in a chamber on the second floor of his house. Women never eat with men save those of their own family (see, also, illustrations, pages 728, 729).

about it, and digged a place for the winefat, and built a tower" (Mark XII: 1).

WATER IS STORED IN ROCK-HEWN CISTERNS

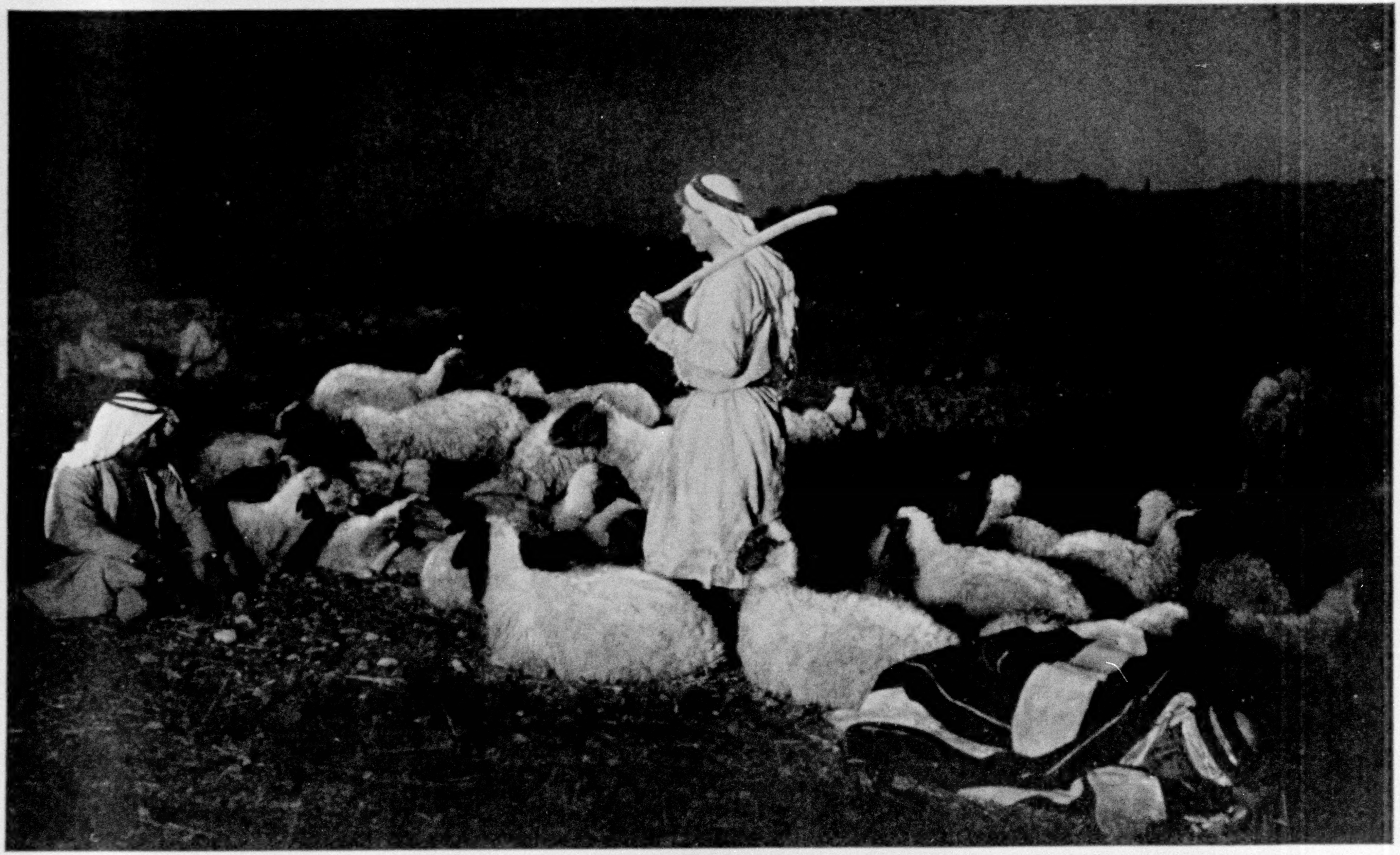
In each vineyard a cistern is dug for water, collected from the winter rain for use during the summer. Hewn in soft, chalklike rock, these cisterns are bottle-shaped, with narrow necks expanding to greater width below.

Because the cisterns are dug deep into rock, the water in them keeps delightfully cool throughout the hot summers. Many a Bethlehemite boasts that the water of his vineyard is the coolest in the mountain. On a recent visit to these resorts, I made a halt to draw a drink from such a cistern. A Bethlehem friend, as he drank, longed for his father's vineyard, where, he said, the water was so cold that one could not drink a glassful without taking it from the lips three times.

It is only after one knows thirst in the desert, and the natives' appreciation of their rock-hewn cisterns, that one can adequately picture David out in the parched wilderness, in the cave of Adullam in the heat of harvest time, weary from long fighting with the Philistines, longingly saying, "Oh that one would give me drink of the water of the well of Bethlehem which is by the gate!" (II Sam. XXIII: 15).

A visit to Bethlehem would be incomplete without further reference to David. The town has been called "The City of David" (Luke II: 4), though the name is applied more correctly, perhaps, to Jerusalem (I Kings II: 10).

Little of David's life in Bethlehem is recorded; for, although it was his birthplace, he did not dwell here long. Here Samuel anointed him king while he yet kept his father's sheep (I Sam. XVI: 11-13). Thereafter Bethlehem ceased to be his home. He followed King Saul for some time, until Saul's love for him changed into jealousy and bitter hatred and made him for years a pursued outcast in the wilderness of Engedi and Tekoa and around the cave of Adullam.



MIDNIGHT WATCH IS KEPT WHILE BETHLEHEM SLEEPS

One shepherd patrols the night camp as the others place their robes in a circle about the combined flock and compose themselves to rest. In the right background rises the dim outline of the town of the Nativity.

STILL THE SHEPHERDS ABIDE IN THE FIELDS KEEPING WATCH OVER THEIR FLOCKS BY NIGHT

To go out with the guardians of the sheep and keep vigil with them under the stars is to be carried back through the centuries to the First Christmas, for the scene of the watch to-day is exactly as it was when Jesus was born (see text, page 734).

AT SUNSET SHEEP ARE DRIVEN TOWARD THE NIGHT CAMP

It is a custom thousands of years old for the shepherds to bring their flocks together at some prearranged spot when darkness falls. This man is just starting for the meeting place.

After Saul's death David reigned for seven years in Hebron, and then for 33 years in Jerusalem, where he died. He never returned to his native town.

WATCHING WITH THE SHEPHERDS IN THE FIELD

In the old churches in Bethlehem no altars have been erected to David. No spots are pointed out as connected with his young life. Throughout this country it is in the vast out-of-doors that one can best visualize its past and realize its great significance. To find David in Bethlehem, one must seek the son of Jesse, "ruddy, withal of a beautiful countenance," on the hills where the shepherds roam. To know Christmas in Bethlehem, one should pass it not in the old churches, historically interesting though they be, but under the star-studded dome of the great out-of-doors, with the shepherds watching over the flocks in the field by night.*

When the village pastures have been expended, the shepherds withdraw into the Wilderness. With no caves or cotes for nightly protection, they club together and from eve until morning keep vigilant watch. I have spent many nights with these simple people, out in the open desert.

After the evening meal, the chief sets

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* See "Among the Bethlehem Shepherds," by John D. Whiting, in the NATIONAL GEOGRAPHIC MAGAZINE for December, 1926.

AS PIPERS, THE OLDER SHEPHERDS EXCEL

On this simple instrument the desert musician produces appealing strains (see Color Plate II). The extra length of reed makes possible deep bass tones.

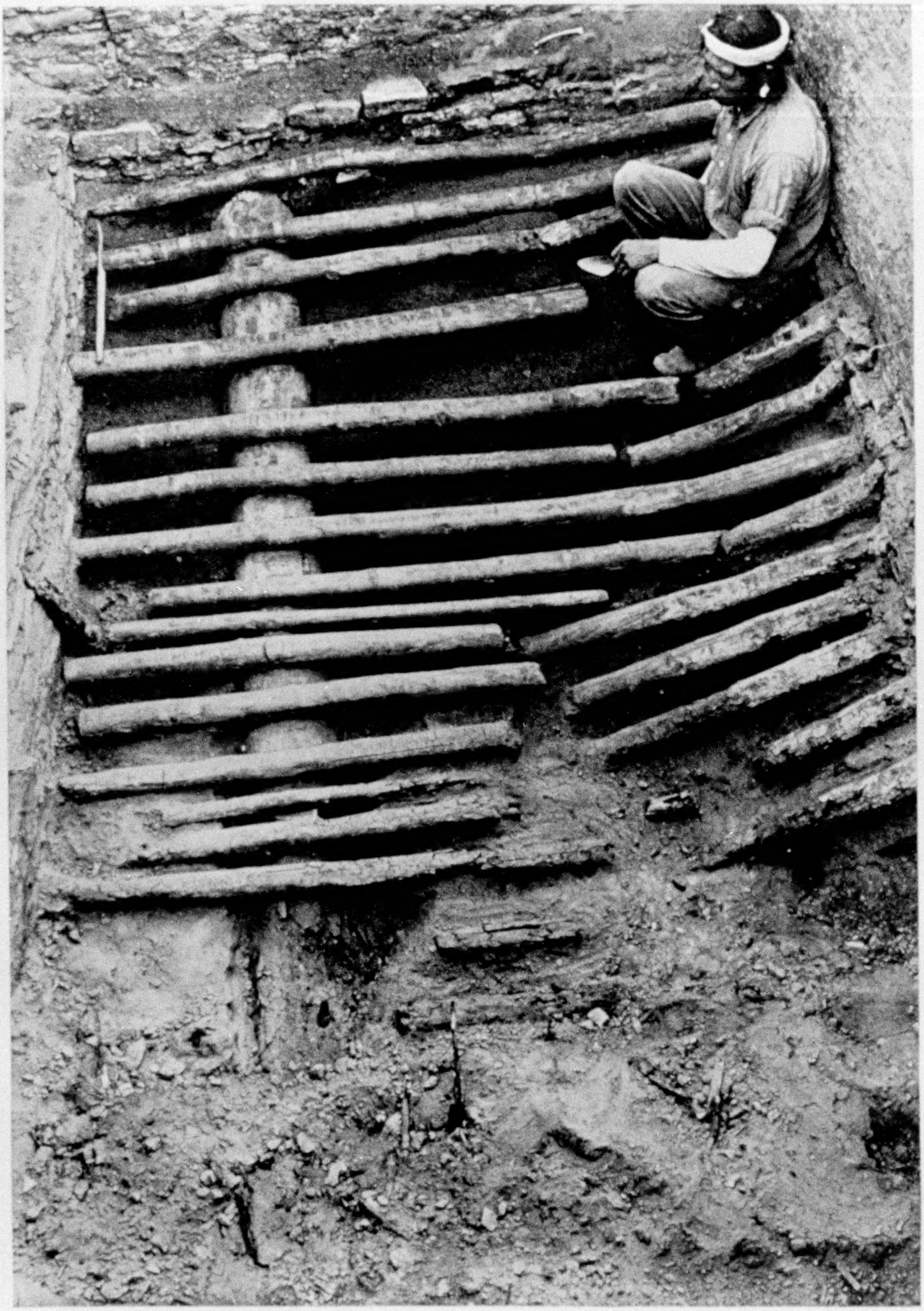
the watches, for it is already dark in this land of short twilights. Taking for a guide a bright star, he measures with outstretched arm its course through the sky. Each span is to be one watch, in which two will keep guard together.

Now the first guards, with rod and staff, move about the outside edge of the flock. From time to time the yelp of a wild jackal or the laugh of a striped hyena causes the sheep to stir as if to stampede; but reassuring calls from the watchers quickly restore quiet.

The shepherds not on guard lie down to rest, spacing their places of repose in a rough circle around the fold.

The first three or four watches bring the midnight to deepen the star-studded indigo. Silhouetted against the sky is the faint rim of the mountains that shut out the world and more than 1,900 years of time. It is as if the world were transplanted into the past. St. Luke's account of the First Christmas repeats itself: "And there were in the same country shepherds abiding in the field, keeping watch over their flocks by night."

When the pink of dawn heralds the birth of a new day, the shepherds are astir, talking one to the other. As they start up the inclines, it seems almost that they are saying, "Let us now go even unto Bethlehem and see this thing which has come to pass" (Luke II: 15).



Photograph by O. C. Havens

CEILING POLES IN ONE OF THE ROOMS OF PUEBLO DEL ARROYO, CHACO CANYON

By the recovery and study of such timbers, the seemingly unsolvable riddle of the Southwest has been solved—How old are the pre-Columbian pueblo ruins? The original inhabitants had no written language; they left no calendars; yet science has found a way to read their secrets, not in stones, but in wood and charcoal.

THE SECRET OF THE SOUTHWEST SOLVED BY TALKATIVE TREE RINGS

Horizons of American History Are Carried Back to A. D. 700 and a Calendar for 1,200 Years Established by National Geographic Society Expeditions

TWO series of National Geographic Society expeditions, one which explored the now famous Pueblo Bonito ruins in Chaco Canyon, New Mexico, and the other which sought to ascertain the actual age of those ruins, have culminated in findings of prime importance to the history of pre-Columbian America.

They have pushed back the historic horizons of the southwestern United States to a period nearly eight centuries before Columbus crossed the Atlantic.

They have discovered not only the age of the great communal dwelling of Pueblo Bonito, metropolis of our aboriginal Southwest, but also have dated some 40 other ruins whose time of occupancy hitherto had been unknown.

Moreover, they have developed a tree-ring calendar which can be applied to all early ruins in which datable timbers exist.

A collateral finding of great interest, yet to be developed, is the possible relation between the weather cycles clearly revealed in this tree-ring calendar of the southwestern United States and similar cyclic variations being recorded by a third National Geographic Society Expedition (in conjunction with the Smithsonian Institution), an expedition which still is in the field, at Mount Brukkaros, South West Africa, making daily observations of solar radiation.

Members of The Society have received reports in the NATIONAL GEOGRAPHIC MAGAZINE from time to time of the marvelous finds of the Pueblo Bonito Expeditions. One major question remained to be answered: "How old is Pueblo Bonito?"

Primarily to solve that problem, The Society invited Dr. A. E. Douglass to undertake the investigations which gave the answer, and far more—a chronology that includes many major ruins of the Southwest and thus dates the hitherto untimed annals of pre-Columbian history.

In the following summary of his work, Dr. Douglass relates the fascinating story of how he, an astronomer, was led from the study of sun spots to cutting tree and timber sections, which, when codified and joined together, yielded this priceless secret of North America's remote past.

The members of the National Geographic Society can obtain much satisfaction in having supported such important and successful explorations.

THE EDITOR.

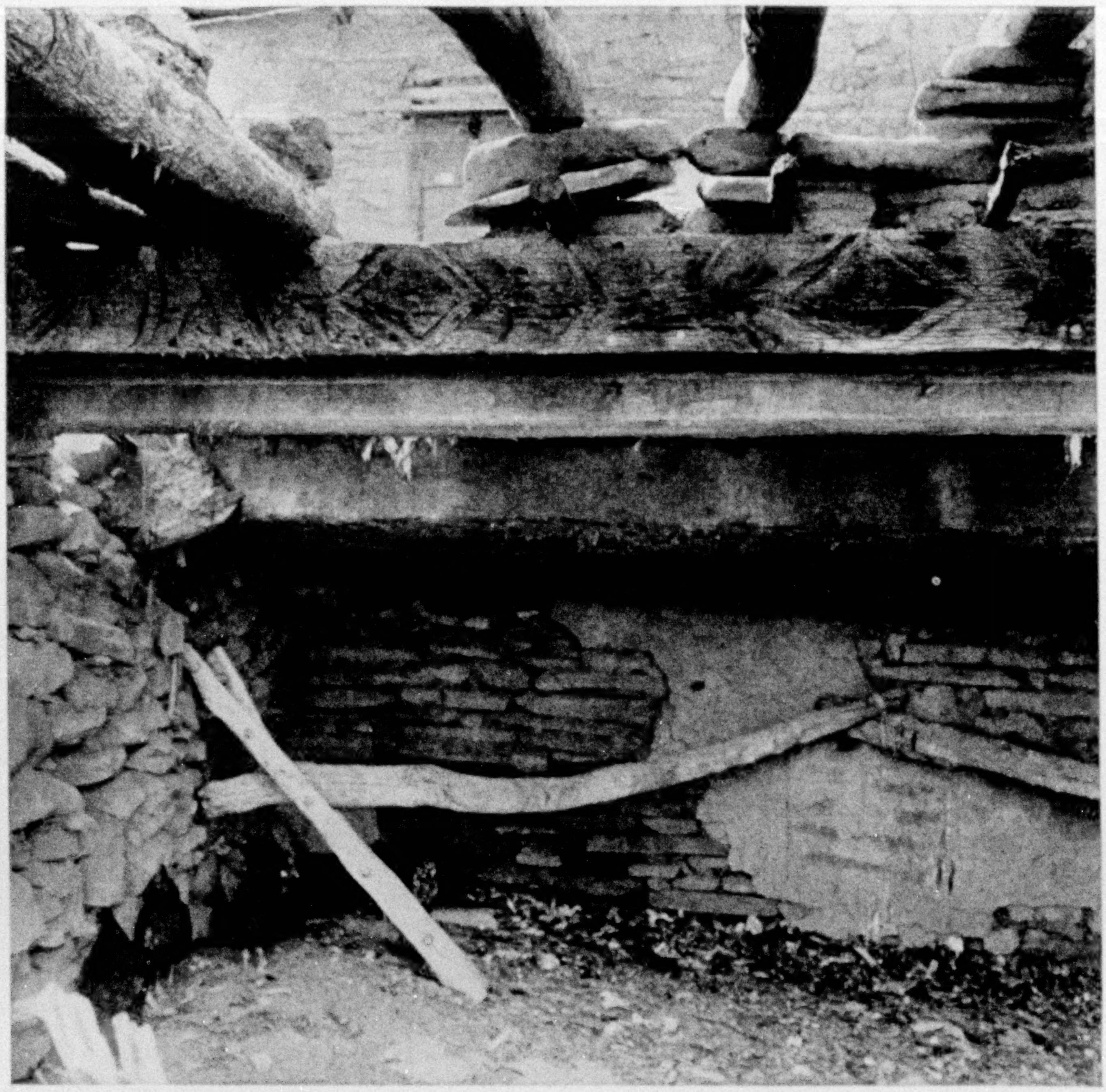
BY ANDREW ELLICOTT DOUGLASS, SC. D.

Leader of the National Geographic Society Tree-Ring Expeditions and Director of Steward Observatory, University of Arizona

BY TRANSLATING the story told by tree rings, we have pushed back the horizons of history in the United States for nearly eight centuries before Columbus reached the shores of the New World, and we have established in our Southwest a chronology for that period more accurate than if human hands had written down the major events as they occurred.

We are now able definitely to announce the important dates in the history of Pueblo Bonito, oldest and largest of the great Indian communities, in Chaco Canyon, New Mexico, the exploration of which has been carried to completion by eight National Geographic Society expeditions.

Furthermore, we can now date nearly



Photograph by Neil M. Judd

EARLY SPANIARDS CARVED THIS OLD BEAM FOUND AT ORAIBI, ARIZONA

From such supporting timbers The Society's expedition could not cut full cross-sections. In these cases cores were drilled which showed the tree-ring sequences. The Indians consented when given small fees and bits of turquoise were deposited in the holes to "ward off the spirit of decay" (see text, page 753, and illustrations, pages 760 and 762).

forty prehistoric ruins in the Southwest and reconstruct there a succession of major events through which Indian settlements rose, passed their heyday, and disappeared.

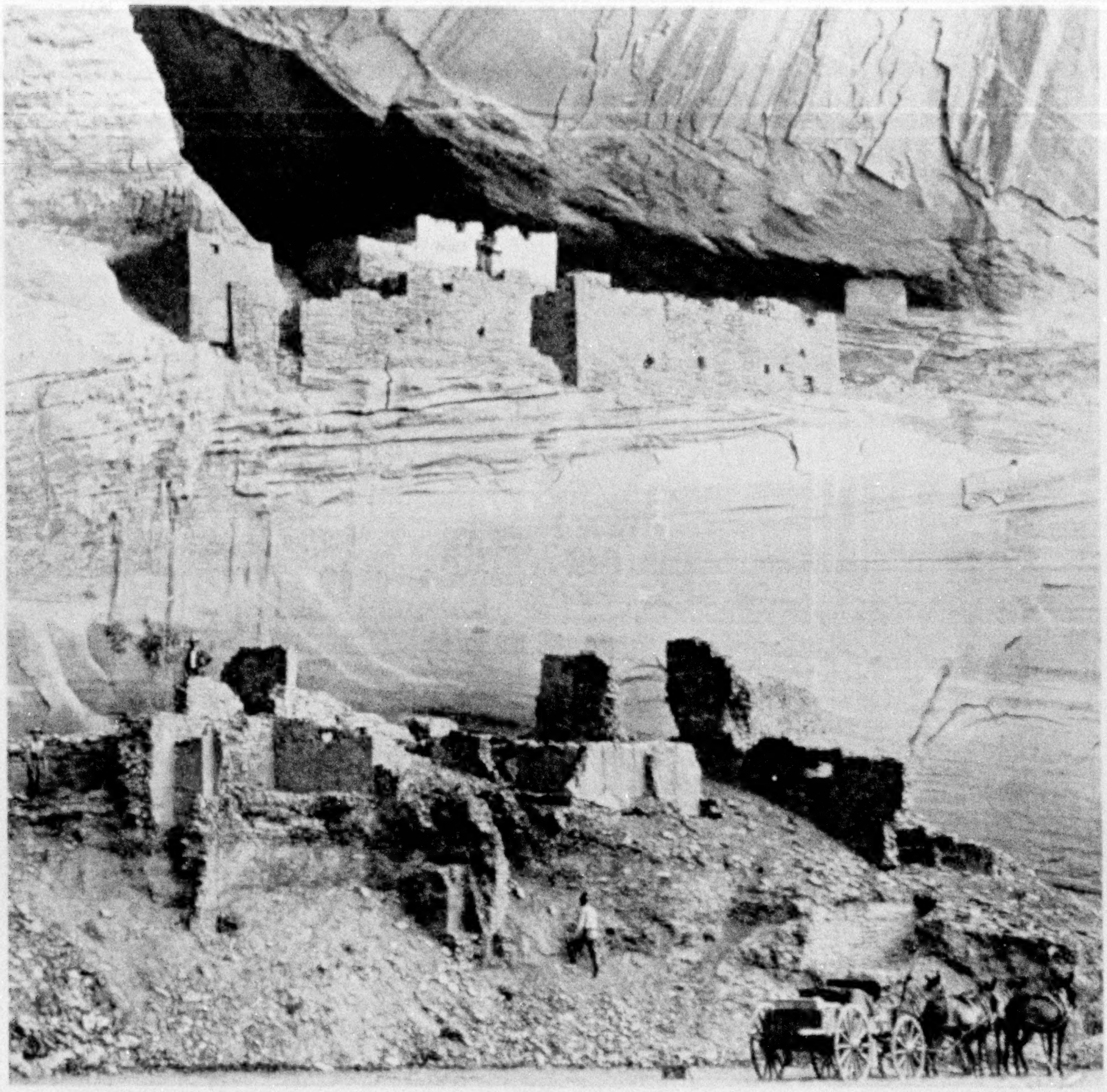
Just as the far-famed Rosetta Stone provided the key to the written mysteries of ancient Egypt, so the collection of an unbroken series of tree rings has made clear the chronology of the Southwest.

Through this work we have learned of some outstanding events in America which were contemporaneous with the conquest of Spain by the Moors, and we know that certain Pueblo Indian settlements were enjoying their golden ages when William the Conqueror faced Harold the Saxon at the Battle of Hastings.

These researches have carried the calendar back to A. D. 700 in the Southwest, and they have provided the beginnings of a continuous weather chart for 1,200 years.

PRICELESS TREE TRUNKS HAVE BEEN BURNED

Many a prehistoric jewel has been given to the flames unwittingly because no one knew the importance of tree rings in recording the passage of years. Where fuel was scarce, fragments of precious timbers



Photograph by Charles Martin

WHITE HOUSE RUIN CLINGS TO THE CLIFFS OF CANYON DE CHELLY IN ARIZONA

Ancient house timbers found and studied here prove that this picturesque communal dwelling was built and occupied as early as 1060—a quarter of a century before the Domesday Book of medieval English history fame was compiled.

at many an ancient ruin in the American Southwest have been used as firewood by sheep-herder, prospector, and even archeologist. They were scraps of wood, nothing more. The Bible story of the stone which the builders rejected, but which became the head stone of the corner, has found a counterpart in the wood that the modern searcher overlooked, for it has become a key to prehistoric chronology.

Through long-past ages and with unbroken regularity, trees have jotted down a record at the close of each fading year—a memorandum as to how they passed the time; whether enriched by added rainfall or injured by lightning and fire. By learning how to read these records—specifically those of the pines—we have discovered a magic key to open mysterious books and interpret the meaning of their writings.

In favorable regions, rings in trees may be identified, each one in its appropriate year, and traced back till we get to the utmost reach of living trees, and then beams from ancient ruins and buried logs carry the story back for many more centuries.

Thus these tree records have provided us with an American calendar reaching

Photograph by Neil M. Judd

A NAVAJO MAN OF JADITO VALLEY

In this arid Southwest, man and tree alike cry always for water and more water. Tree rings reveal when rain fell or failed, and the Indian's most common invocation is his prayer for rain.

beyond the rise of Charles Martel or the Mohammedan invasion of India. Some of these trees were cut a thousand years ago. From them we have learned the exact building dates of major ruins of the southwestern United States as definitely as we have been able to fix the dates of Old World monuments of the ancients whose records are inscribed on stone.

A CHAPTER IN THE BOOK OF WEATHER FORECASTING

For the last six years this detective story of science has been evolving out in Arizona. Seen from one angle, it pushes back the bounds of history in our Southwest and gives us human activities—even tragedies—among the native inhabitants for hundreds of years. From another angle this history in trees tells us the climatic story of the Southwest with amazing accuracy.

When a real theory of climate has been developed and we can predict drought and flood over a period of years, this Arizona story in tree rings will have played a creditable part in developing that climatic foresight which is perhaps the most valuable economic advantage yet lying beyond our reach.

From this combination of climatic facts and human movements we have unearthed evidence of a human cycle, the time during which village Indians of the Southwest could live in one place till they depleted its resources and were compelled to move to new localities.

Success in ascertaining the age of Pueblo Bonito and many other prehistoric ruins throughout the Southwest is to be attributed primarily to the National Geographic Society, whose Committee on Research has sent various expeditions under the direction of Mr. Neil M. Judd to collect the vast number of specimens required in these investigations.* The University of Arizona has generously permitted me to devote much of my time to this objective for several years, and the interest of the Carnegie Institution of Washington in the climatic phases of this study really paved the way along which we advanced to our present, independent goal.

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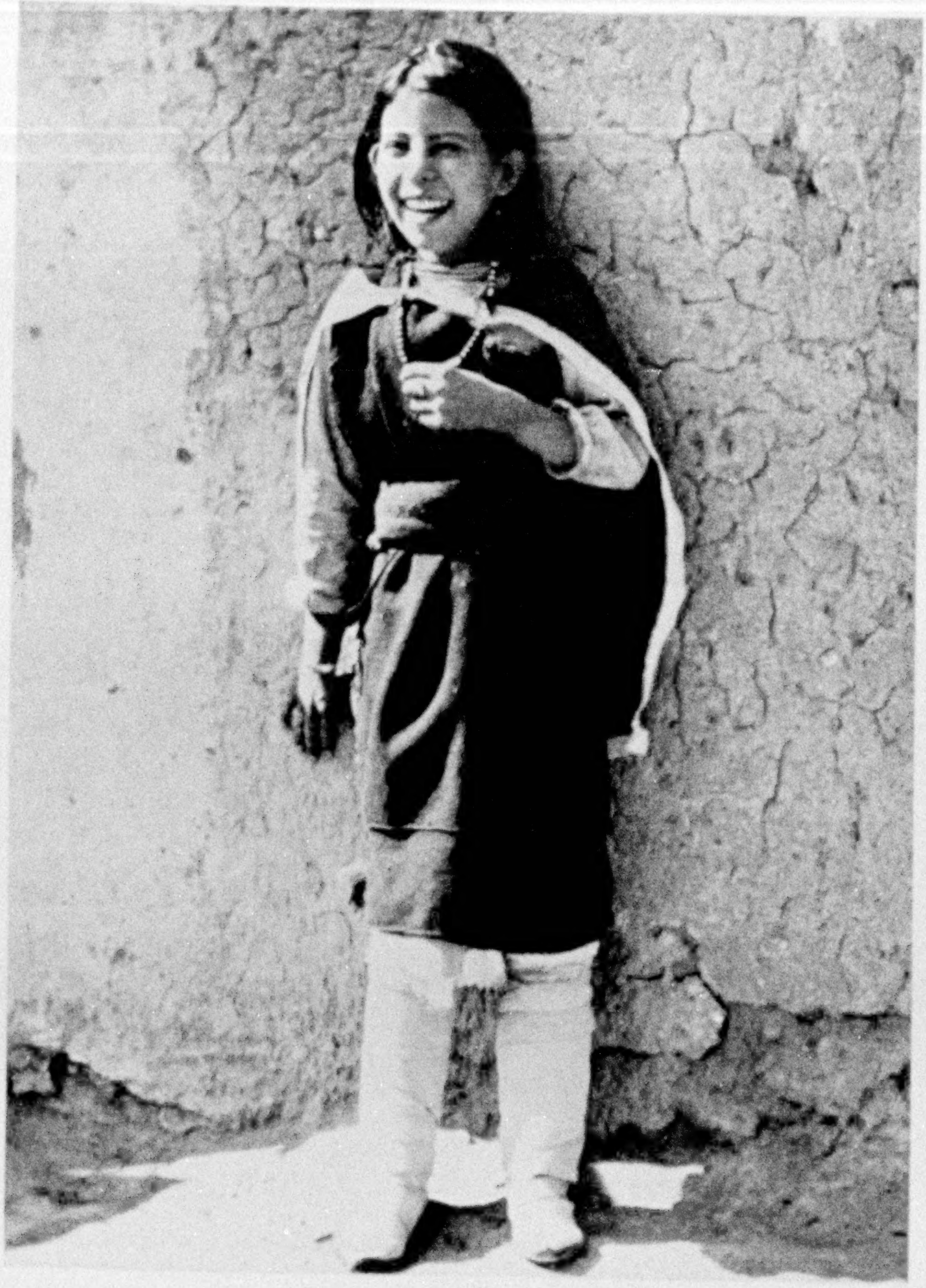
* See, in the NATIONAL GEOGRAPHIC MAGAZINE, "A New National Geographic Society Expedition," June, 1921; "The Pueblo Bonito Expedition of the National Geographic Society," March, 1922; "Pueblo Bonito, the Ancient," July, 1923; "Everyday Life in Pueblo Bonito," September, 1925; and "Exploring in the Canyon of Death," September, 1925.

READING THE DIARIES OF TREES

The method which we have used in extending the historical calendar of the Southwest is the outcome of a long attempt to read the diaries of trees. Every year the trees in our forests show the swing of Time's pendulum and put down a mark. They are chronographs, recording clocks, by which the succeeding seasons are set down through definite imprints. Every year each pine adds a layer of new wood over its entire living surface of trunk and branches.

If every year were exactly the same, growth rings would tell the age of the tree and little more. Only in rare cases would they record exceptional events of any interest to us. But a tree is not a mechanical *robot;* it is a living thing, and its food supply and adventures through life all enter into its diary. A flash of lightning, a forest fire, insect pests or a falling neighbor may make strong impressions on its life and go into its diary.


Photograph by Frederick I. Monsen

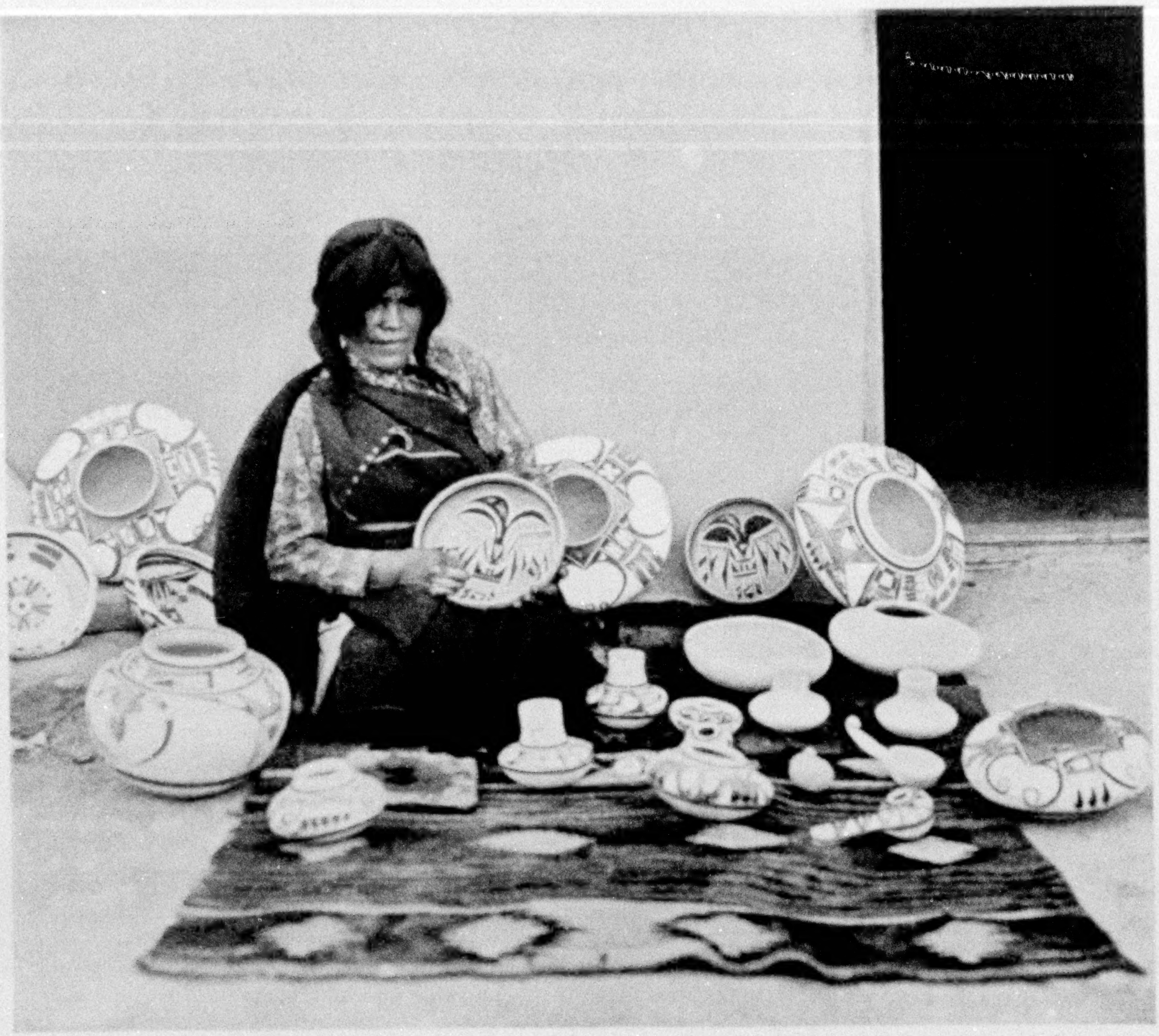
SCION OF ONE OF THE FIRST FAMILIES OF NEW MEXICO

This smiling Indian girl never heard of the tragic eras of drought through which her ancestors passed more than two centuries before Columbus discovered America; but the old, lifeless beams over which she has romped plainly record the dates and duration of such dry periods.

But in the arid regions of our Southwest, where trees are few and other vegetation scarce, the most important thing to man and trees is rainfall. So, in the rings of the talkative pines we find lean years and fat years recorded. The same succession of drought and plenty appears throughout the forest. This fact has helped vastly in our dating work, for certain sequences of years become easily recognized from tree to tree, county to county, even from State to State.

LIVING TREE RINGS MATCHED WITH DEAD TIMBERS

No living, diary-keeping tree in the semi-arid region inhabited by the Pueblo Indians goes back more than a few hundred years; and the giant sequoias of Cali-



Photograph from Dr. A. E. Douglass

NAMPEYO REVIVES A LOST ART

Hopi pottery flourished in the early Spanish era in the Southwest; then became decadent (see text, page 759). Thirty years ago this Hopi woman artist undertook to revive it and with notable success. Hopi pottery is of a rich cream color, of fine grain, hard texture, and rich ornamentation.

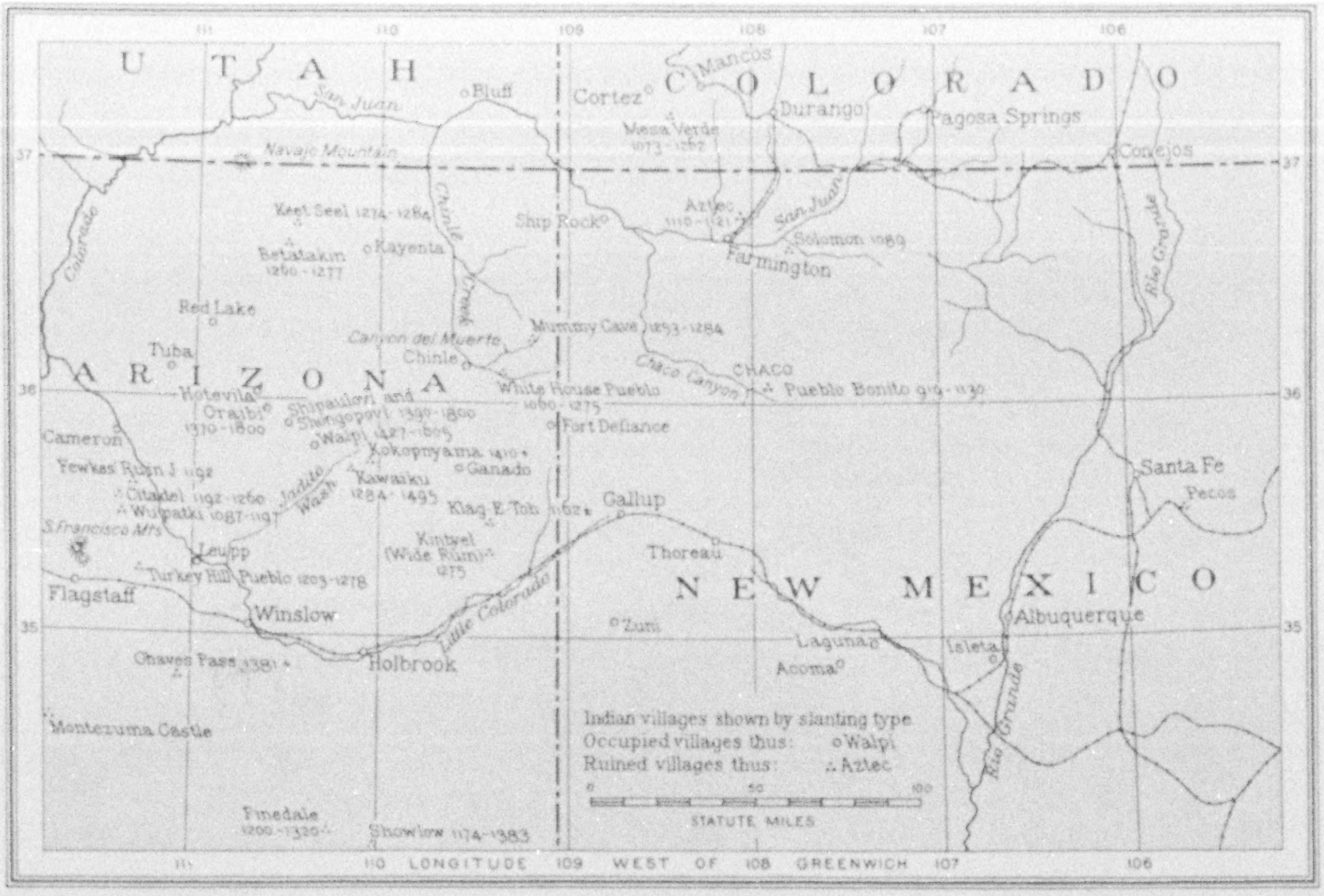
fornia register in a different way those seasonal fluctuations that control the pines of northern Arizona. So when we reached the earliest date which the oldest living weather-recording Arizona tree could tell us about, it became necessary to search for beams that had been cut and used by man before the now living trees took up the story. Here and there we found beams the latter years of which were contemporaneous with the early life of trees still living.

WHY STUDY TREE RINGS?

By arranging these beams in their proper sequence, so that the inner diary entries of each one dovetailed into and matched the outer entries of its predecessor (see illustrations, pages 760 and 769), we knew that we had an unbroken succession of beams and trees.

In this way, step by step, we pushed historical dates back further and further until we found a beam whose earliest ring was formed A. D. 1260 (see illustration, page 760), less than half a century after the Children's Crusade.

The development of this tree-ring study presents an example of how a scientific research starting with a definite idea may lead into unforeseen channels. Originally my work was a study of sun spots. It is known that there is a periodicity in their occurrence; they are most numerous at intervals of eleven years. As an aid in that astronomical investigation, I studied


UTAH
COLORADO
ARIZONA
NEW MEXICO
San Juan
Bluff
Cortez
Mancos
Durango
Pagosa Springs
Mesa Verde 1073-1262
Navajo Mountain
Conejos
Colorado
Keet Seel 1274-1284
Betatakin 1260-1277
Kayenta
Chinle Creek
Ship Rock
Aztec 1110-1121
San Juan
Solomon 1089
Farmington
Rio Grande
Red Lake
Canyon del Muerto
Mummy Cave 1253-1284
Tuba
Chinle
Chaco Canyon
CHACO
Pueblo Bonito 919-1130
Hotevila
Oraibi 1370-1800
Shipaulovi and Shungopovi 1390-1800
White House Pueblo 1060-1275
Walpi 1427-1805
Fort Defiance
Cameron
Kokopnyama 1410
Ganado
Santa Fe
Pecos
Yewkas Ruin 1192
Citadel 1192-1260
Wupatki 1087-1197
Jadito Wash
Kawaiku 1284-1495
Klag-E-Toh 1162
Gallup
S. Francisco Mts
Leupp
Kintyel (Wide Ruin) 1275
Thoreau
Turkey Hill Pueblo 1203-1278
Flagstaff
Winslow
Little Colorado
Zuni
Albuquerque
Laguna
Isleta
Chaves Pass 1381
Holbrook
Acoma
Montezuma Castle
Indian villages shown by slanting type
Occupied villages thus: Walpi
Ruined villages thus: Aztec
0 50 100
STATUTE MILES
Pinedale 1200-1320
Showlow 1174-1383
111
110
109
108
107
106
37
36
35
LONGITUDE WEST OF GREENWICH

Drawn by A. H. Bumstead

TREE RINGS HAVE GIVEN DEFINITE DATES TO THESE INDIAN RUINS

In many instances one group name is applied to several ruins. For example, in the Chaco group, various portions of Pueblo Bonito were under construction at different times—919, 1017, 1033-92, 1102, and 1130; Pueblo del Arroyo was being built in 1052-1103. In the Mesa Verde group, Cliff Palace is dated 1073; Oak Tree House, 1112; Spring House, 1115; Balcony House, 1190-1206; Square Tower House, 1204, and Spruce Tree House, 1216 and 1262. Mr. Earl H. Morris, in collaboration with the author, supplied beams from which the dates 1110-21 for Aztec Ruin and 1133-1135 for cliff dwellings in Grand Gulch, Utah, were ascertained. In the Chinle district Mr. Morris aided in fixing the years 936-57 for Sliding Ruin, 1253-84 for Mummy Cave, and 1060-96, 1219, and 1275 for White House Pueblo.

trees, for solar changes affect our weather, and weather in turn affects the trees in Arizona's dry climate, as elsewhere.

Our study of sun spots and their influence upon weather and the consequent effect upon vegetation as recorded by tree rings progressed most successfully. The first confirmation of our general interpretation of a relationship between tree rings and sun-spot periods came in a most dramatic way.

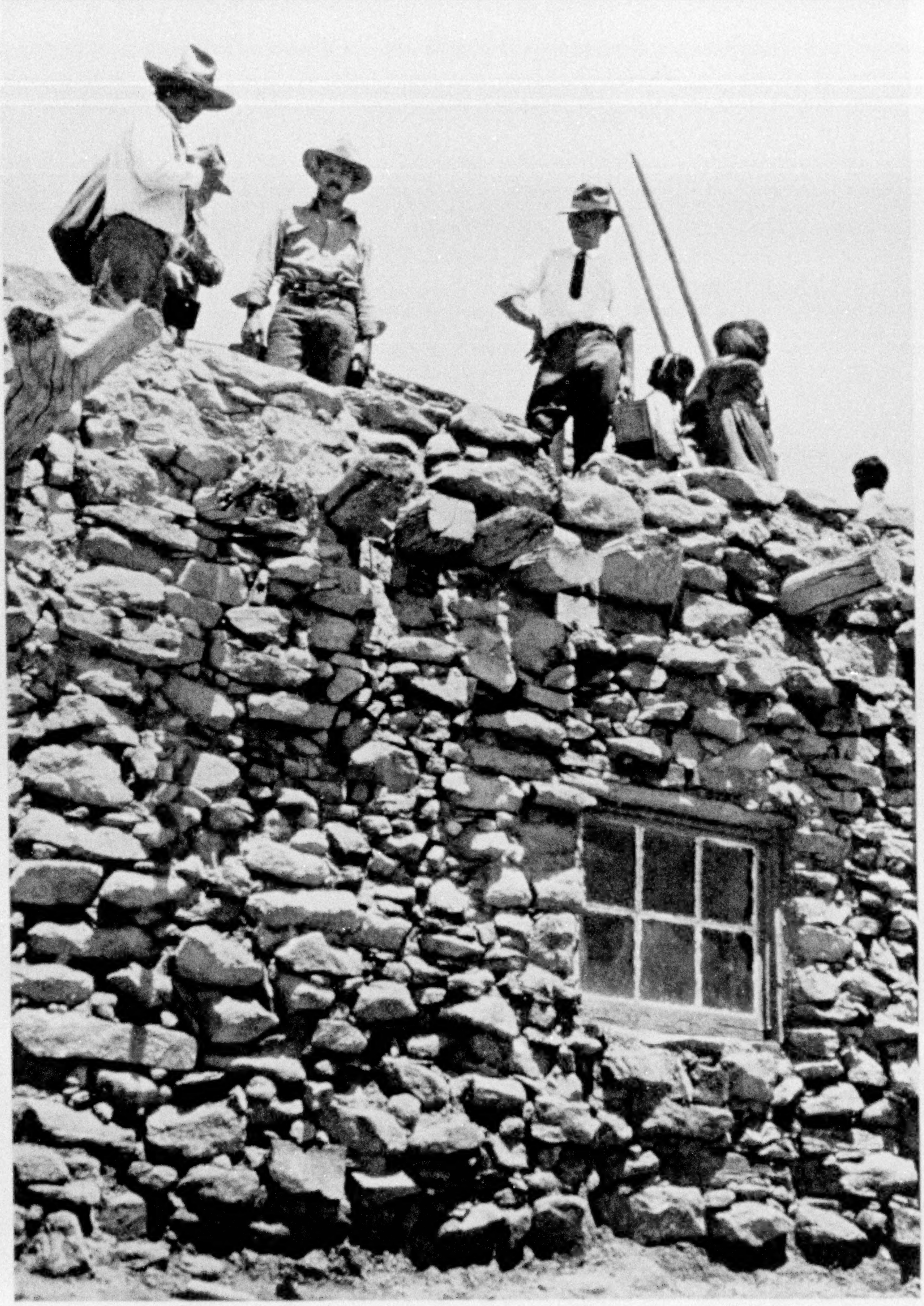
Evidence of the eleven-year sun-spot cycle had been easily found in Arizona pine trees. The regularly recurring periods had been recorded for 500 years by tree rings, *except for the interval from 1650 to 1725*. During that 75 years the tree rings gave no evidence of periodical changes in the weather such as were to be expected.

Several years after we had encountered this puzzling fact the late Dr. E. Walter Maunder, an eminent English astronomer, unaware of my findings, wrote to me that he had discovered that *there were no sun spots between 1645 and 1715*, and that if my tree rings did not indicate some effect of this absence of sun spots, my work was being conducted on an erroneous hypothesis.

TREES ARE NATURE'S RAIN-GAUGES

The coincidence between the failure of Arizona trees to register any sun-spot effect upon the weather during those years, and establishment of the fact, by entirely independent study, that the customary sun-spot cycle did not occur during approximately the same period of years helped confirm the relationship between the growth of trees and solar changes.

The remarkable dependence of rings in



Photograph by Dr. A. E. Douglass

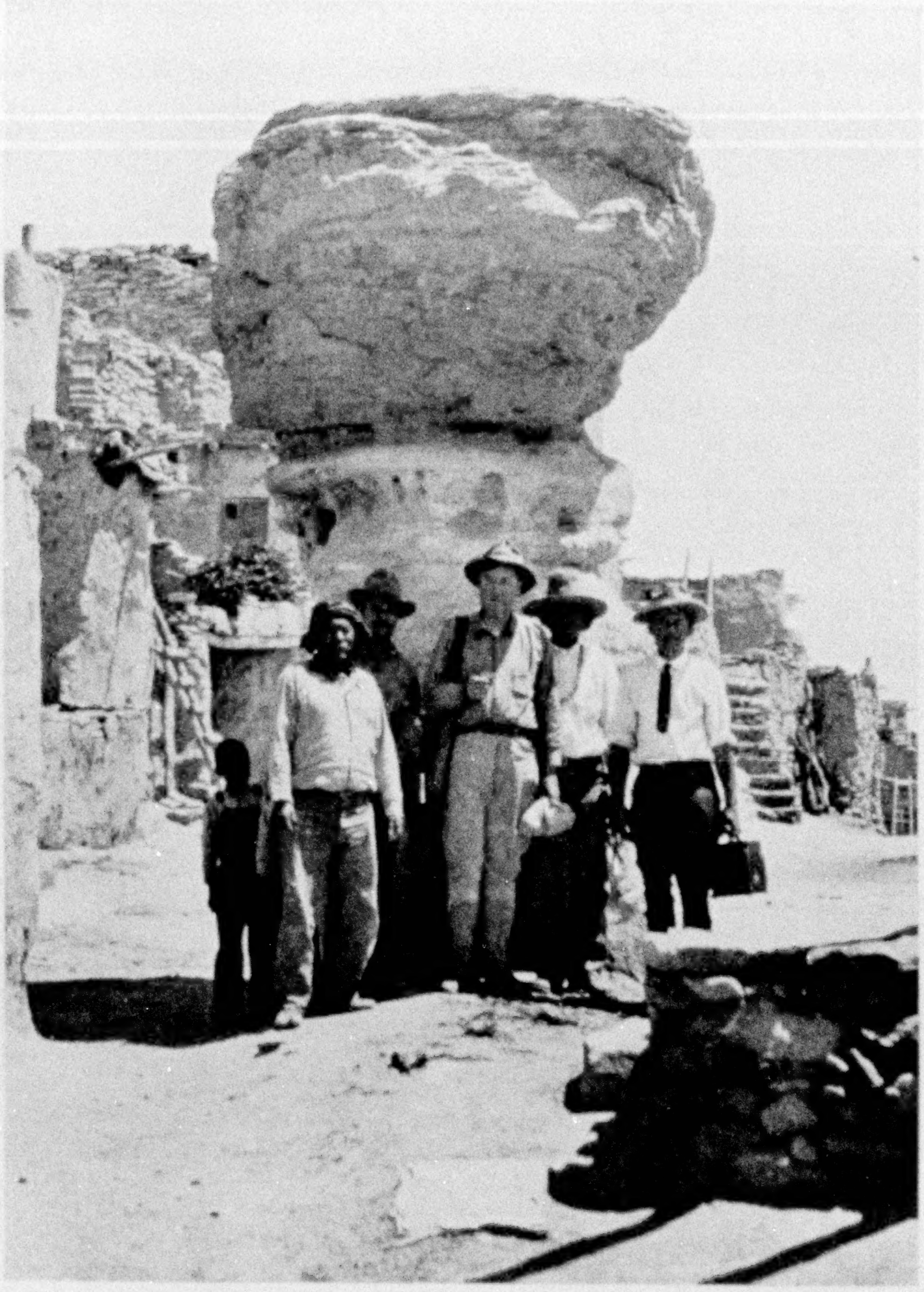
OLD BEAMS IN A MODERN HOPI DWELLING AT WALPI (SEE, ALSO, PAGES 745 AND 761)

Prehistoric pines trimmed with stone axes and saw-cut cottonwood logs may roof a Hopi house to-day. Windows and first-story doors are fairly recent innovations, for fifty years ago the Hopi were still fearful of Navajo and Apache depredations. The builders of Hano, inseparable from modern Walpi, were invited from the Rio Grande Valley about 1700 to help ward off successive enemy raids.

the Arizona pines on rainfall, and especially on winter precipitation, showed that trees are Nature's rain-gauges, and in them we now have the history of drought and plenty in this plateau country for 1,200 years. We can point to certain years, such as 1632, 1379, 1067, and 840, and say definitely that they were years of excessive drought in this region.

Having established such facts, the transition to archeology is easy, for if the rings in a prehistoric roof beam can be dated by these known drought years, then surely it is easy to tell when that tree was cut by the Indians for purposes of building, for such cutting date is the year of—or that next following—the outermost ring, if the tree section be complete.

In 1922 Mr. Judd, leader of The Society's expeditions into Chaco Canyon, after learning of my use of tree rings in ascertaining the comparative ages of Aztec Ruin and Pueblo Bonito, expressed the belief that extension of the method could definitely date Pueblo Bonito, provided enough beams of different ages could be found. With his active coöperation, three expeditions were sent into the field by the National Geographic Society to obtain the necessary beams.



Photograph by Dr. A. E. Douglass

THE FIRST TREE-RING EXPEDITION IN THE PLAZA AT WALPI

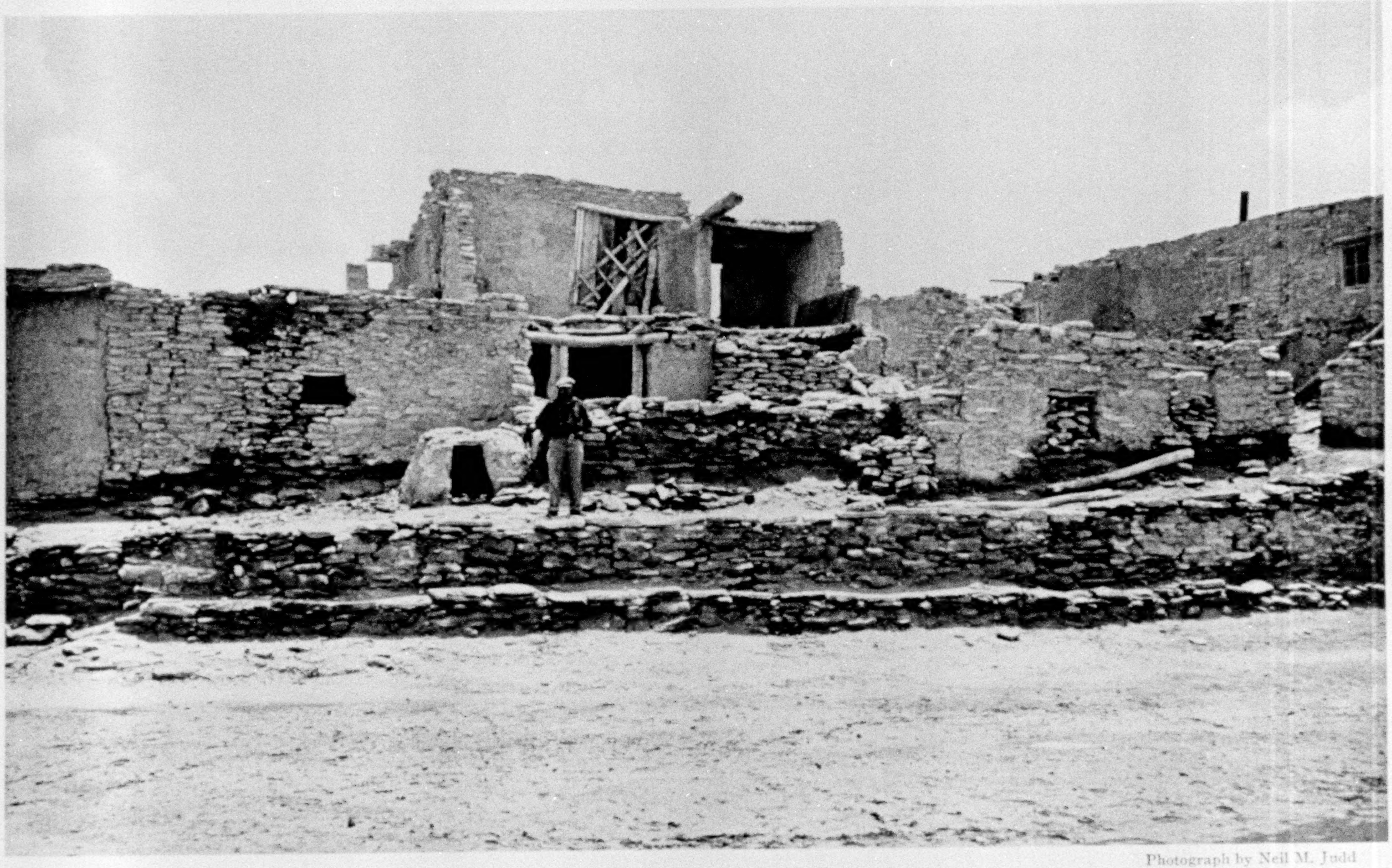
The oldest timbers found at Walpi were cut 65 years before Columbus discovered America.

THE FIRST EXPEDITION INVESTIGATES HOPI VILLAGES

In the early development of the chronology of the ruins of Arizona and New Mexico, the material brought in by Mr. J. A. Jeancon and Mr. O. G. Ricketson, Jr., of The Society's first expedition in search of beams, was invaluable. The expedition started from Flagstaff in June, 1923, and first visited the Hopi villages, where I accompanied them as supercargo for ten days. It was my first experience in picking up old, dried-up pieces of wood, which had formed portions of Indian houses, and trying to assign exact dates to them.

The experience developed only slowly toward satisfactory results, for while the age of some of the pieces was promptly recognized by comparison with Flagstaff trees, others leaped over the centuries and the time when they flourished was still a mystery.

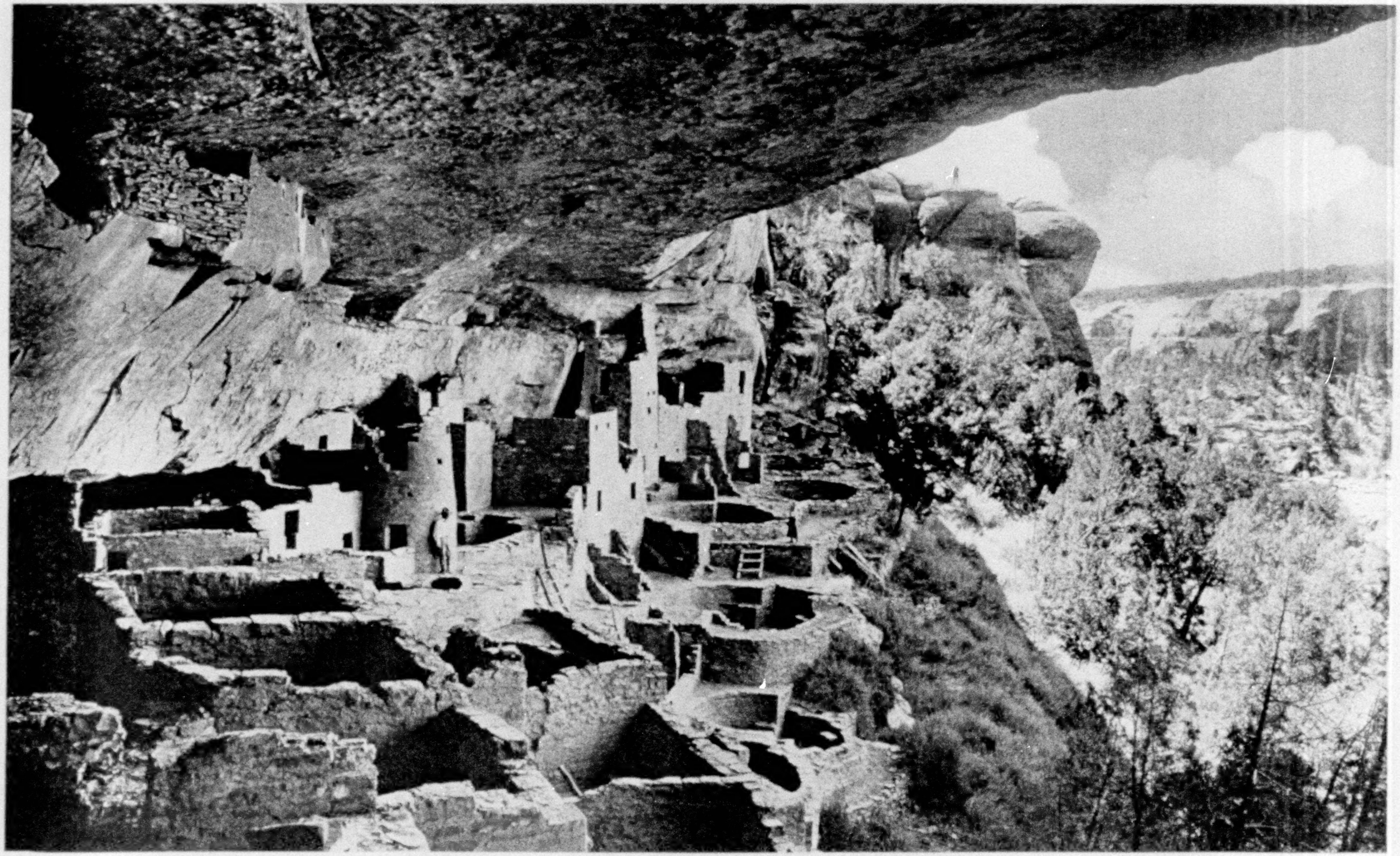
Jeancon and Ricketson proceeded to



Photograph by Neil M. Judd

FROM THIS OLD HOUSE AT ORAIBI CAME THE BEAM WHICH CARRIED HISTORIC CHRONOLOGY BACK TO 1260

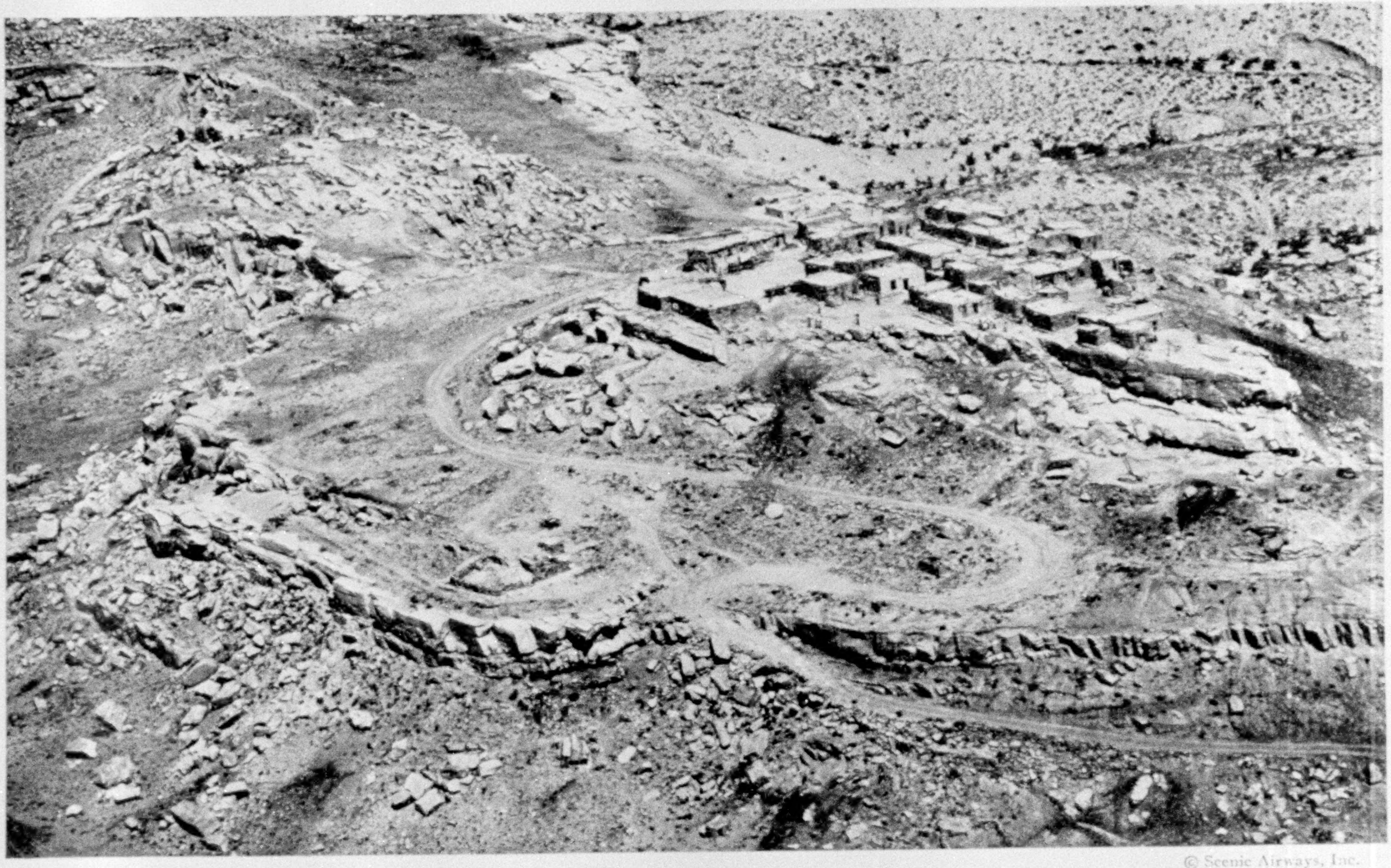
The log which proved to be such an important link in the investigations of The Society had been cut in 1370, when it was 110 years old, and had rendered more than five centuries of service. It now is safely preserved in a tree-ring laboratory in Tucson, Arizona (see, also, text, page 754, and lower illustration, page 760).



Photograph by Charles Martin

THE CLIFF PALACE, A REMARKABLE CENTER OF EARLY CIVILIZATION: MESA VERDE NATIONAL PARK, COLORADO

In this romantic ruin was found a log whose ring count showed that it was cut in 1073.



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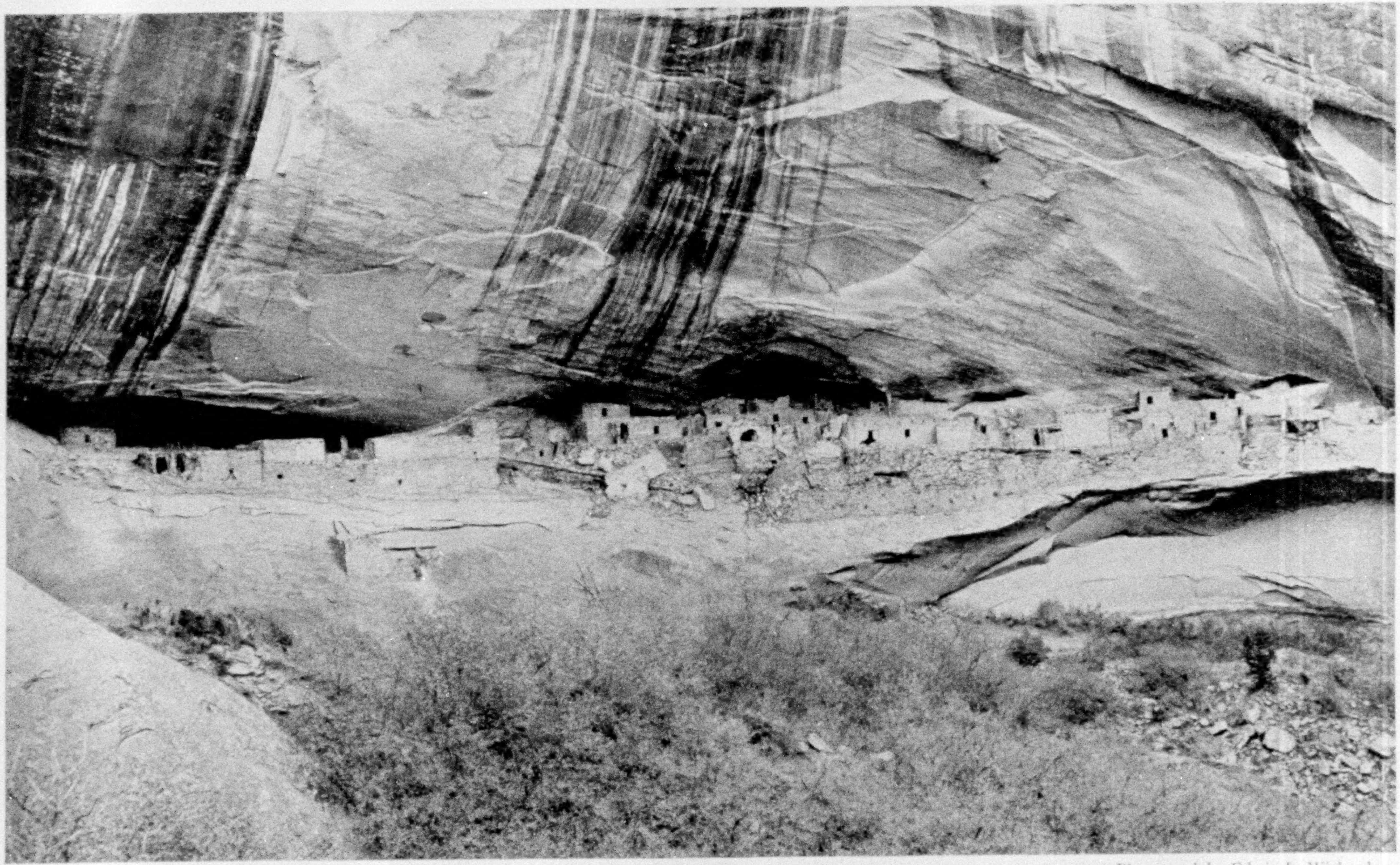
SHIPAULOVI, A HOPI TOWN, SEEN FROM AN AIRPLANE

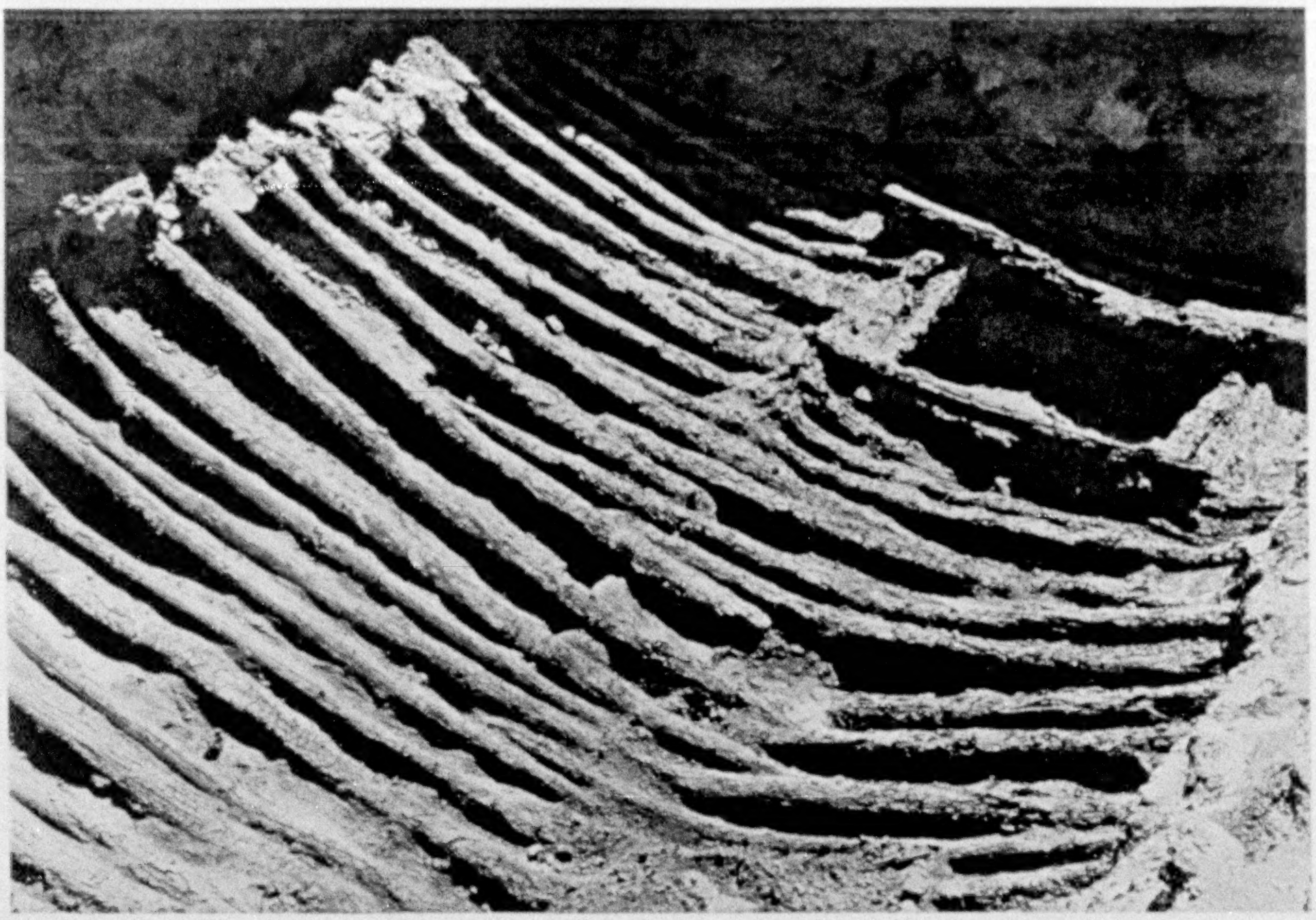
Through such villages three expeditions of the National Geographic Society searched for timbers which might establish the chronology of our prehistoric Southwest. Gifts of velvet, old felt hats, and turtle shells won the confidence of many suspicious Indians (see text, pages 752 and 756).



Photograph by Edwin L. Wisherd

KEET SEEL, THE LARGEST KNOWN CLIFF RUIN IN ARIZONA

From the rings of some of its timbers it was learned that Keet Seel was inhabited as early as 1274. The ruin is a part of Navajo National Monument.



Photograph by O. C. Havens

CEILING POLES AND A HATCHWAY AT PUEBLO BONITO

The timbers at this metropolis of the once prehistoric Southwest are unimpeachable witnesses of the sequence of events through many centuries. One beam from Pueblo Bonito tells us that it began to grow in the year 700 and had attained the age of 219 years when the Bonitan builders, with their stone axes, cut it down for use in erecting their great communal center (see text, page 767).

examine certain old ruins on the mesa to the north of the Hopi villages—Fire House to the east; Wide Ruin, south of the latter; and the ruins of Chaco Canyon, Mesa Verde, and the Rio Grande Valley. As a result, 100 excellent timber specimens came to me for examination.

This material was examined as fast as time allowed. In July, 1927, it was evident that a new chronology had been discovered. Wupatki and Citadel ruins, near Flagstaff; Mummy Cave, in Canyon del Muerto, and Mesa Verde, in southwestern Colorado (see map, page 743), had first been developed, each by itself, into local chronologies covering 100 years or more. Subsequently it was found that all three joined into one continuous sequence 180 years in length.

Archeologists agreed, from study of the cultural remains, that these ruins were generally later than Pueblo Bonito. Therefore we had a second chronology partly filling the uncharted interval of time between the prehistoric timbers of Chaco Canyon and modern trees near Flagstaff and leaving two gaps shorter than before, but of unknown length. On a trip to Betatakin and Keet Seel, out in the northern Navajo country, in 1927, excellent timber specimens, which showed that they belong to the latter part of this second chronology, were obtained (see page 760).

THE PREHISTORIC GAP BETWEEN CITADEL AND PUEBLO BONITO IS BRIDGED

Thus the newly developed chronology showed that Citadel, Fewkes' Ruin J, Wupatki, Mesa Verde and Mummy Cave, Betatakin, Keet Seel, and other pre-Spanish pueblos belonged to the same general period. Between all of these and Pueblo Bonito, however, there was a gap which Mr. Judd believed to be short, but which bothered us a great deal. Finally, we checked over the records given us by a juniper and a pine and compared them with the latest rings from Pueblo Bonito,

Photograph by E. W. Haury

MODERN HOUSES STAND ON ANCIENT RUINS WHERE BEAM HH39 WAS FOUND (SEE PAGE 770)

The Mormon town of Showlow derived its name from an early-day card game. The stakes were high. One cowboy bet his all that he held the lowest card—and lost. So the spot became "Show low."

and, lo, what was a distressing gap yesterday to-day was filled in and two chronological periods were united into one (see text, page 767).

Thus, on February 3, 1928, I was able to write Mr. Judd that the gap between the Pueblo Bonito period and that of Citadel and associated ruins had been bridged, that we had more than 580 years in a continuous prehistoric sequence.

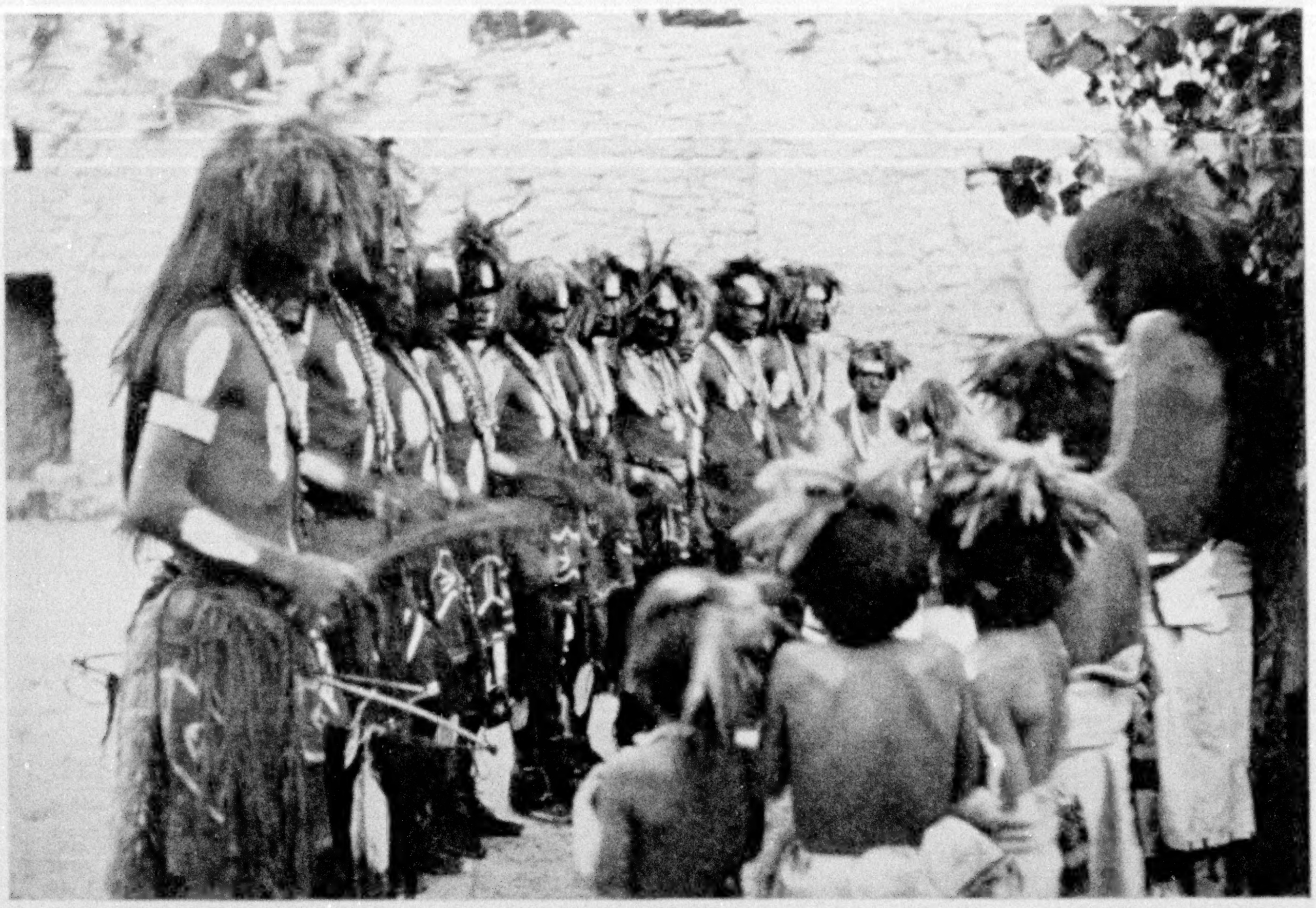
I now made an effort to discover very old trees in the hope that thereby we could link this united and extended prehistoric sequence with our modern chronology, and offered a reward for any pine 600 years old. We already had a section from a 640-year-old tree, but it had a serious injury near the center, which we did not understand then, but which we now know was caused by the great drought of 1276 to 1299. The next 100 years of that tree's life were very complacent and gave no configurations of rings that could readily be recognized.

An attempt was made to match our prehistoric pine sequence with that of the long-lived sequoias of California. This failed to give any certainty in dating, for there was no point at which the correspondence between the two stood out in a striking manner. I was compelled to renew the search for beams.

BEAMS CUT BY STONE AXES SOUGHT IN HOPI VILLAGES

As successive generations of Hopi Indians had dwelt among the mesas 100 miles north of where the Santa Fe Railroad crosses the Little Colorado River, near Winslow, we believed that here was a promising field for search. Oraibi, for instance, has long been regarded as the only one of the present Hopi villages that has been continuously occupied since a period antedating the advent of the Spaniards, in 1540. We knew that many of its logs were cut by stone axes. Some of these, we reasoned, must be very old.

Thirty years ago Oraibi, with its 900 inhabitants, was the largest of the Hopi



Photograph by Sumner W. Matteson

THE SNAKE DANCE LINE-UP AT SHONGOPOVI, HOPI RESERVATION, ARIZONA

Like the Bean Dance described on page 754, the Snake Dance is celebrated as a prayer for rain. It is based on the tradition that snakes are elder brothers of the Hopis and are more powerful than they in compelling the nature gods to bring rain.

villages; but when the rains began, after the great drought of 1880 to 1904, their farms were washed away, the underground water was lowered, and crops failed. Dissensions arose, and they felt that some of the inhabitants should leave to try their fortunes in new places. The actual division came in 1906 and was over the unrelated question of whether their children should be sent to school, as ordered from Washington.

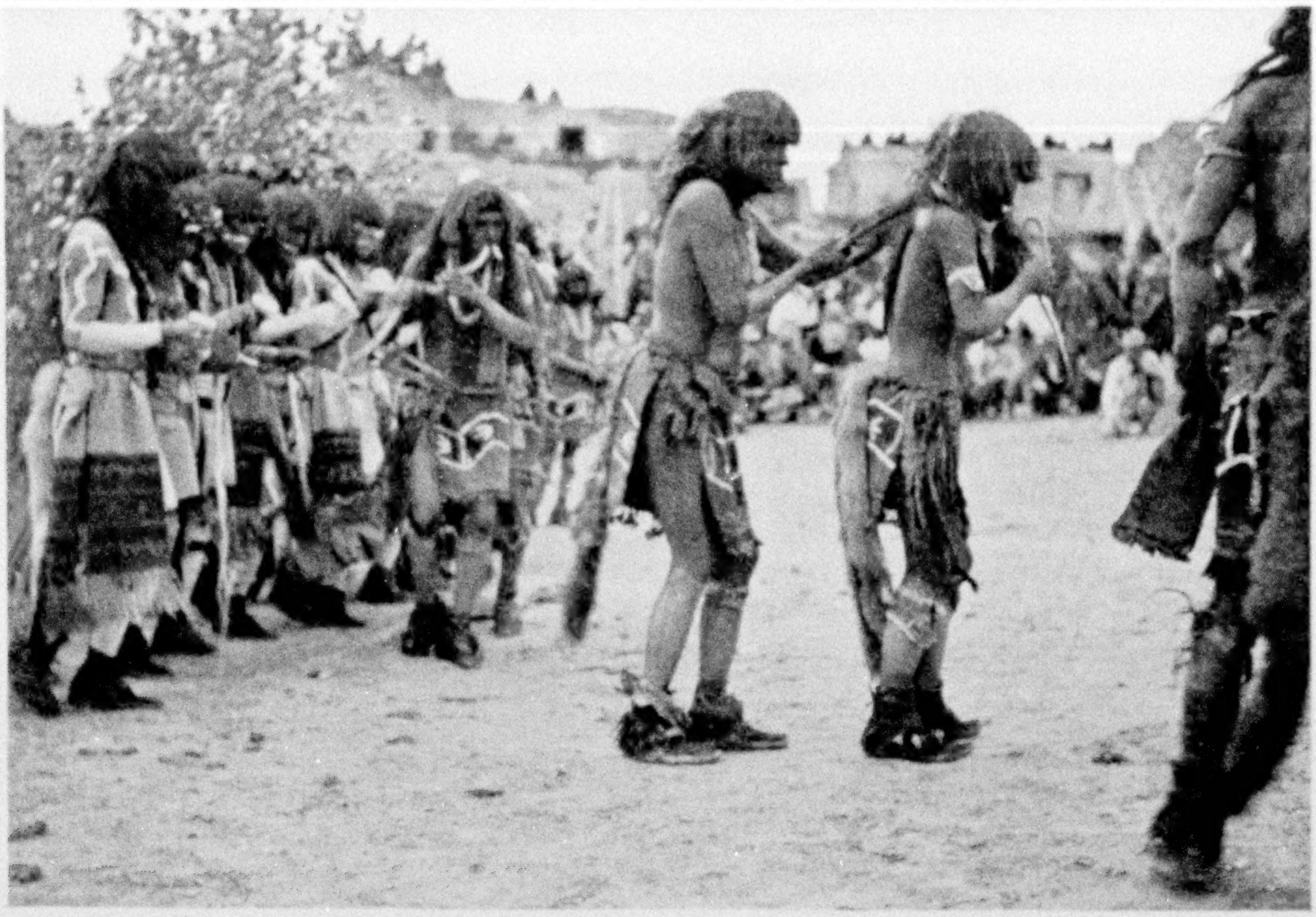
The decision as to which party should leave was reached in a characteristically Hopi way, by a tug of war. This was held just above the present village, where an inscribed rock still marks the spot. The losing side founded the neighboring village, Hotevila, and a large part of the old town was left desolate, but it was not unowned, as we found.

WE LIVE WITH THE HOPI TO OBTAIN SPECIMEN BEAMS

We needed some one to live a month or two in Oraibi and make borings in every available old timber. Mr. L. L. Hargrave was selected. In order to command the full coöperation of the Indian chief, Tawa-Guap-Tiwa, I carried along a present of purple chiffon velvet, which was so lovely that I was afraid to show it to Mrs. Douglass for fear it would never get out to the Indian reservation. The chief's exclamations and gestures of delight on receiving the gift showed how keenly it was appreciated.

We rented two rooms in an Indian house, and the old chief, who spoke only a few words of English, called on us often. Others, whose knowledge of English was as limited as was ours of Hopi, came likewise. They were all socially inclined; smoked our cigarettes as if born to the brand and seemed to enjoy teaching us their language.

The logs sought for our dating work were all ceiling beams, originally cut to span the rooms and make floors for the rooms above. They extend through the walls and in front rooms project outside, a delight to the tourist and an example to the modern architect. We were equipped



Photograph by Sumner W. Matteson

LIVE SNAKES HELD IN THE MOUTH ARE A PART OF HOPI RITUAL

After the ceremonial the dancers purify themselves. Oraibi, Arizona, the scene of this dance, has been occupied by Indians since pre-Spanish times.

with a saw to cut cross-sections from the projecting ends of these logs and a tubular borer to drill out cores from the timbers within doors.

We went at once to the abandoned Kwan Kiva, at the southeast edge of town, and bored all the logs in sight, only to find that many were of cottonwood or juniper, which were almost useless for our purpose. Eventually we realized that the much-desired older logs were generally of pine and Douglas fir, whose rings are the best of all. After dating numerous sections, we discovered that the use of these trees ceased about A. D. 1770. Evidently by that time all the available trees within portable distance had been cut down. Thus we learned something of the injurious effects of human occupation on forests.

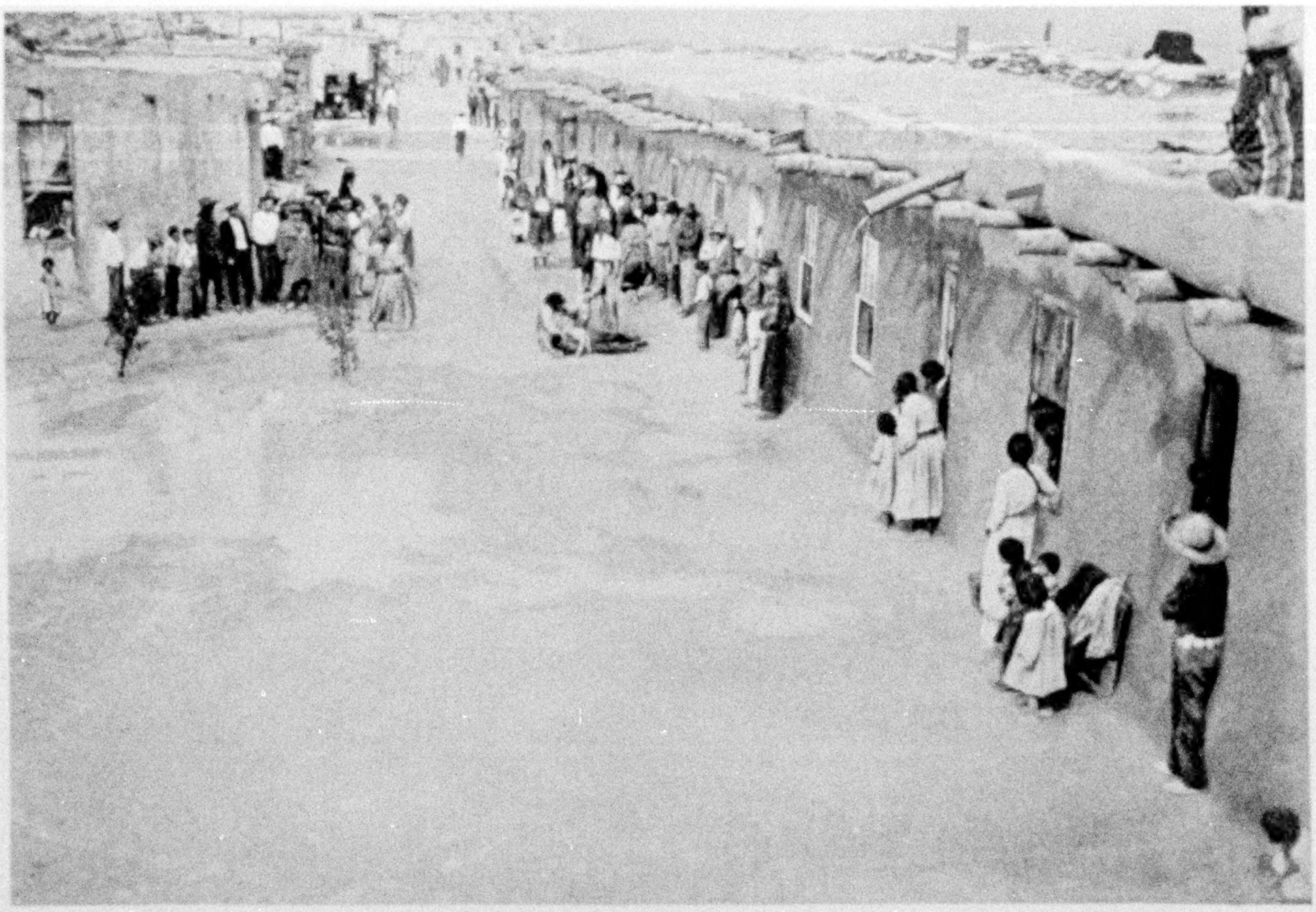
TURQUOISE APPEASES THE "SPIRIT OF DECAY"

Ends cut with a stone ax then became the distinguishing character. Small chips taken off showed whether the rings had the strong marking of pine or fir, the weak lines of cottonwood, or the narrow, erratic lines of juniper. Length also helped in the selection. Pre-Spanish beams used in the dwellings are rarely more than eight feet long. Spanish beams are easily twice that and are nearly always found in the kivas, or ceremonial chambers.

We call them "Spanish" because these timbers were salvaged by the Hopi when they destroyed the missions, in 1680; they have been in use ever since, and tradition has it they were originally carried by Indians on foot, mostly from the San Francisco Mountains. There are probably a few long pre-Spanish beams still in use.

At times in our beam gathering we had to appease the spirits for the Indians by inserting a piece of turquoise at the base of the plug with which we filled the hole made by the extraction of a core. This was to prevent the lodgment of the "spirit of decay" in the timber (see page 738).

A rounded log in the Antelope Kiva at Oraibi gave the year 1475 as its outermost ring, and the outside wearing, which at first I thought was intentional, later became recognized as invariable in the



Photograph by Hugh Stevens Bell

OLD WALPI CELEBRATES FOLLOWING A CEREMONIAL DANCE

For three days after the dance, anything a man holds above his head is a present for the first woman who can seize it. The women believe in teamwork, and the contests which they stage are less gentle than football (see, also, illustrations, pages 752, 753, and 755).

oldest logs. It was cut about 1520. Also, a specimen from Moong Kiva, at Walpi, appeared to be nearly complete, and its outside rings gave 1490 as its cutting date. Ladder poles were more recent. One ladder showed one pole cut in 1570 and the other in 1720, which reveals a story of breakage and repair.

WE FIND A BEAM USED FOR 500 YEARS

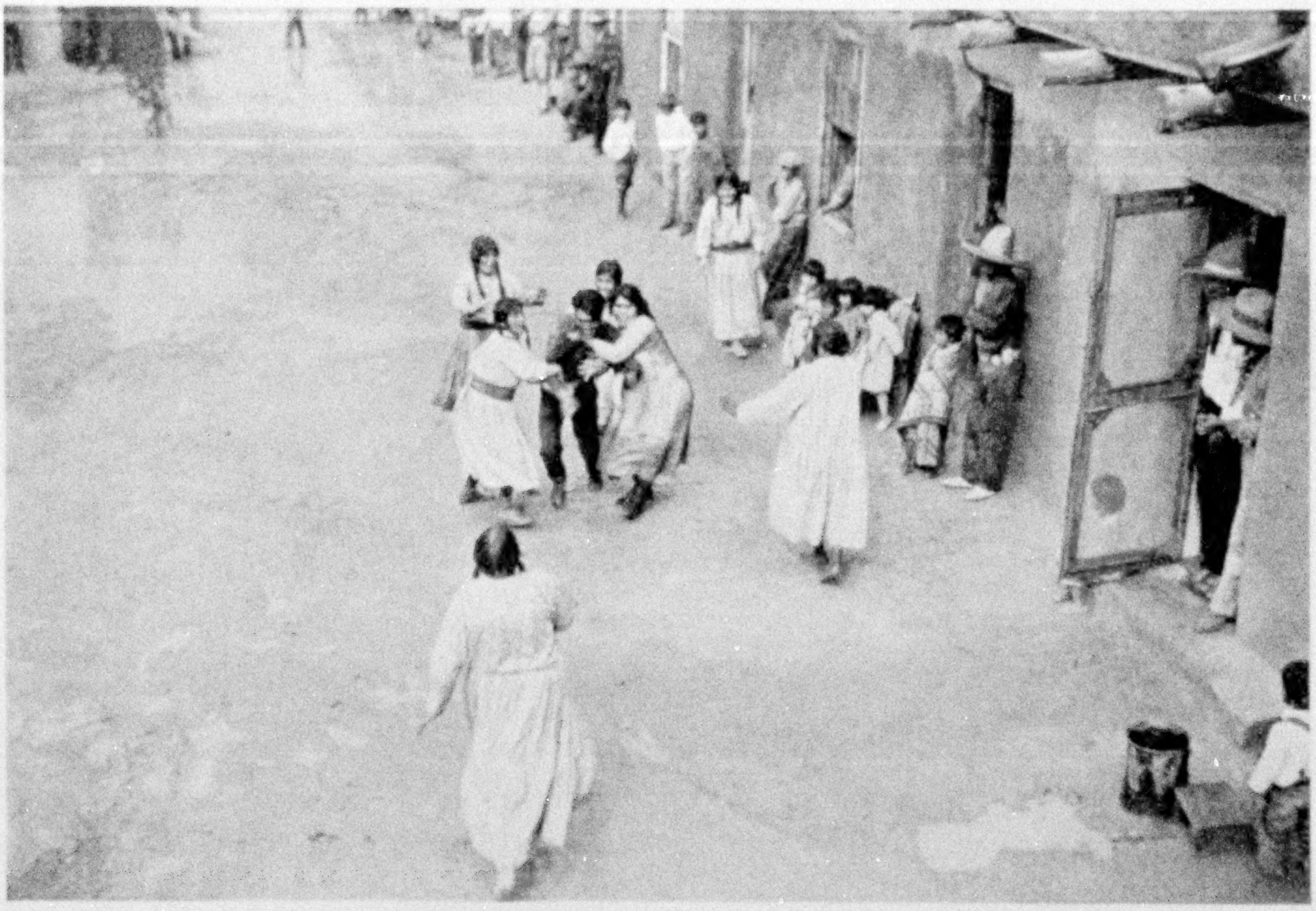
Naturally I wanted the oldest log. The oldest we found was in that section of Oraibi abandoned in 1906. We entered on the second floor of a three-story house, over a terrace consisting of older rooms filled with rubbish. We went through several chambers and entered into a part of the structure still in good condition. Mr. Hargrave lifted a flat stone on the floor, revealing a hole into the room below.

I swung down a couple of feet onto a rubbish heap made of the sandy sweepings of years from the room above. This had been covered with a thin floor of clay to make a small storeroom some eight feet square and three feet high. With a flashlight I could look around.

In the center was an upright post, not more than six inches in greatest diameter, supporting the center of the ceiling. It was partly flattened, and as it was holding up the floor of the room above, no cross-section could be taken, but its longer diameter was bored by Mr. Hargrave. The rings of this beam gave a superb series from 1260 to 1344 (see illustration, page 760). Allowing for wearing, it was probably cut as early as A. D. 1370 and had been in use continuously for well over 500 years. The whole log, six feet in length, was finally obtained on August 7, 1929, and is now safely preserved in my laboratory at Tucson. Other timbers, perhaps equally old, are rapidly being broken up by the Indians for fuel.

A BEAN DANCE TO BRING RAIN

Kivas are subterranean ceremonial rooms. One of the best is known as the Moong Kiva, at Oraibi. It is some-



Photograph by Hugh Stevens Bell

HOPI INDIANS SKYLARKING AFTER A WOMEN'S DANCE

The whole village turns out to see the fun, as maidens corner a defiant brave and reduce him to submission, after he has had the audacity to walk down the street with a prize held above his head (see, also, illustration on opposite page).

what larger than the others and is used for more general gatherings.

Our friend, Chief Tawa-Guap-Tiwa, was directly in charge of it. He said, "Are you going to be here to-morrow night?" I had a fleeting thought that he was going to say sternly, "Perhaps you had better not be here." But, on the contrary, he said that there would be a final practice of the Bean Dance from about 8 in the evening to 12. We were invited to take part in the rehearsal.

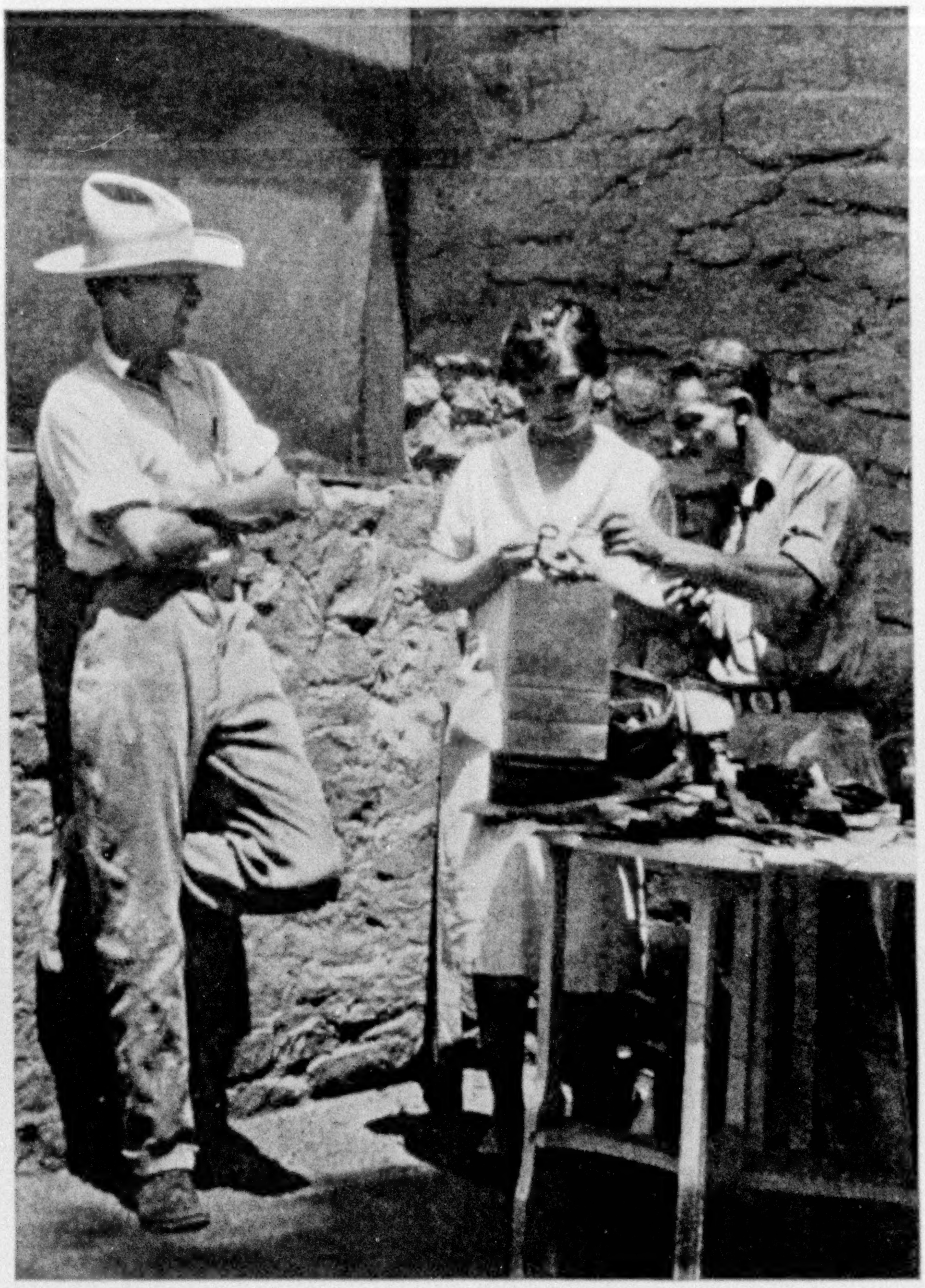
At 8:15 we heard the big drum, went down the ladder, and took our seats on the bench. The chief's father sat near by, smoking native tobacco in a stone pipe; other participants smoked cornhusk cigarettes. A small cast-iron stove and an ordinary kerosene lamp seemed altogether out of place at this old Hopi ritual. After modest hesitation, Mr. Hargrave accepted the chief's invitation to enter the dance, and for an hour ably represented our party.

Twenty men formed a semicircle in the large end of the kiva face to back. As the chief beat time on the great drum the Indians chanted their prayer. Within the semicircle sat an older man, who from time to time threw in a word or two.

The men in the semicircle represented the spirits of the rain, who dwell 100 miles away, in the great cloud-covered San Francisco Mountains, near Flagstaff. The man in the center was the Father of the Gods.

The spirits of the rain were saying in effect, "Our brothers in Oraibi are ready to plant their beans. They need rain, so that the beans will grow and supply food for themselves and their families." Then the Father of the Gods calls out, "Yes, let's go and help them."

As I sat watching the dance, I realized that I was one of three terms in a human series: First, the Indians of a neighboring village, who believe that rain is actually controlled by proper magic, performed by their powerful priests; then those before me, who were praying to the more powerful spirits that rule the rain; and, lastly, I, myself, who was there to study the rainfall history in pine timbers



Photograph by Dr. A. E. Douglass

STUDYING BITS OF TELLTALE CHARCOAL UNDER MAGNIFYING GLASSES

and learn the great natural laws which govern the coming of the rain. We were all doing exactly the same thing according to our lights.

INDIAN MASKS MADE FROM OLD FELT HATS

In the old days, kivas were rarely opened to strangers. Close collusion with the priests who had them in charge was necessary. On one occasion Mr. Hargrave sent me a core drilled from a large roof beam. It was only two and a half inches long and clearly did not go to the center of that timber. I asked him to try to obtain the remaining section of it on his next trip. He explained that the reason he did not complete the extraction of the core was that some of the Indians had raised objections to his work in that kiva, and he had been obliged to stop.

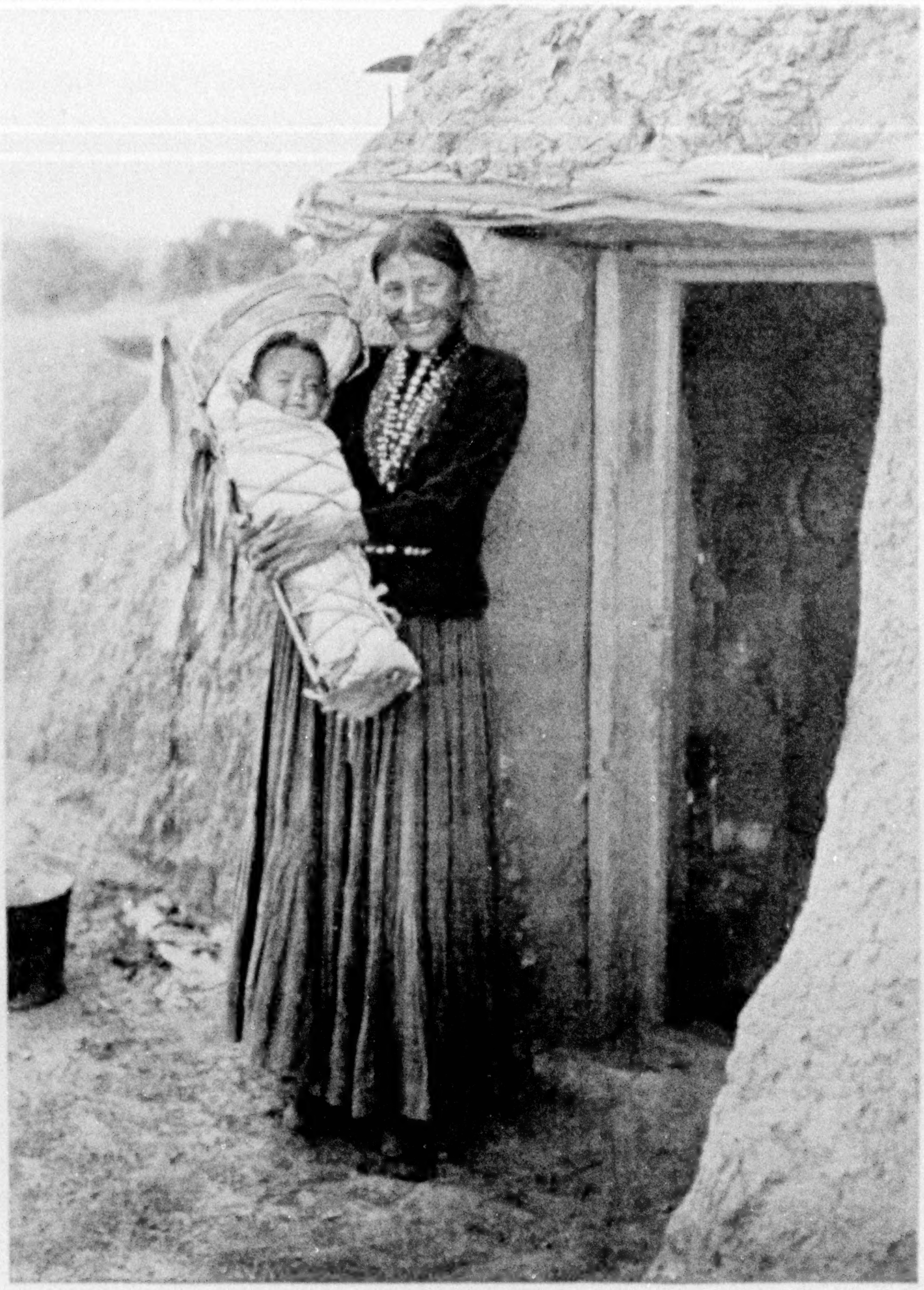
I discussed the subject with Chief Tawa-Guap-Tiwa upon my next visit, but he rather evaded the point, and we did not get the remainder of that specimen. I learned, however, that the Bean Dance was coming soon and that old felt hats were needed. I visited a number of friends, collected twenty old ones, and carried them back to Oraibi as a present.

From old felt hats masks can be made, and the gift was very much appreciated. The Indians sewed the brims in a vertical position, made holes for the eyes, and painted noses and mouths. They built up the tops of the hats into very elaborate ceremonial headdresses and painted them in gorgeous colors. These they showed me with great pride.

Another gift that brought us good will was a present of six turtles. From turtle shells rattles are made and worn around the right leg in ceremonials. We gave the turtles to the important men and then had a conference with the chief of the Ha-Wi-A-Wi clan, in whose village stood the beam whose boring we wanted to complete. I asked him if he would permit us to continue that boring and perhaps to bore one or two other logs. He said he was very sorry, but that the boring would endanger the roof of the kiva. I told him that I knew he was protecting the interests of his people, and especially those who owned and assembled in the kiva, and I would be guided by his judgment.

He answered that white people rarely or never showed that consideration or understanding of the interests of the Indians. Later he gave his consent for us to go outside the kiva and dig down in the ground until the end of this beam was exposed. There we could find out if it were of value. When we did so we found nothing that would add to our chronology.

Meanwhile, we discovered in the floor some planks which looked old and we obtained permission to examine them. Using a gasoline lamp, I spent most of the time from 5 o'clock in the afternoon until midnight lying flat on the floor, with a lens in my eye, my nose almost touching the boards, counting and measuring the rings in those planks. The only success that those seven hours brought us was to discover from the outer rings of the fourth board that all had grown between the great drought of 1580 and the familiar Spanish dates of about 1640.



Photograph by Neil M. Judd

A NAVAJO WOMAN AND HER PAPOOSE AT PUEBLO BONITO

To the Indians of the Southwest the successful reading of the tree rings in the beams of their old ruins seems as uncanny as foretelling an eclipse of the sun.

INDIAN WOMEN PROVE A STUMBLING BLOCK

In the acquisition of beam material women were always more difficult to deal with than the men. At Walpi we found one kiva near the south end of the mesa which had at least ten good logs. We hunted up the priest of the kiva and his handsome son. We discussed our needs in front of their house. Presently we discovered that a woman of the household was listening just inside the window, and every once in a while was urging the Indians to charge "everything that traffic would bear."

So our interpreter suggested that we go to the kiva and talk. There we informed the chief of our customary price for each log that we bored; but that, as this was a kiva and as the logs were larger than usual, we would pay double the usual sum. They replied that since this was a most sacred spot and the god himself dwelt in a niche which we could see, they would have to charge four times our regular

Photograph by Sumner W. Matteson

A PLAQUE WEAVER OF MISHONGNOVI

She is wearing a silver necklace of squash-bloom pattern. Near the Hopi pueblo of Mishongnovi, in Arizona, are two sandstone pillars. One has fallen. The name means "at the place of the other which stands erect." This pueblo was searched for old timbers, but produced none of special significance.

price. All I could see in that abode of the god was a handful of prayer sticks.

Finally we reached a compromise, and if we had made our borings at once all would have been well. But we did not have our instruments with us at the time. Several days later some one had raised an objection to our boring those particular logs and we were not permitted to touch a single one.

HOPI PUEBLOS BUILT ABOUT 1400

We looked through Shipaulovi and Mishongnovi without finding many promising specimens. We also visited the three villages close together on the first mesa: Walpi at the southern end, Hano at the center, and Sichomovi at the northern end of the shoestring. The inhabitants of these villages had all moved to the high mesas after the rebellion of 1680.

We found that the Government had recently brought in a large number of fresh spruce logs from the Black Mesa, 40 miles away, and the Indians had used these to rebuild their kivas and had cut up the wonderful old Spanish logs and beams for firewood. Hence the dozen specimens from Walpi gave no new information, and there is little prospect of more in the future.

After making large collections from old Oraibi and from Shongopovi and seeing a few specimens from the other villages, it seemed to me fairly evident that we would gain nothing by further search in the Hopi villages. The earliest cutting date discovered was close to the year 1400. One or two logs could be interpreted as having been cut a little before that, but after all our effort no additional piece was found whose inner rings began earlier than 1300. The inference seemed obvious; the pueblos abandoned following the revolt of 1680, when the Hopi erected their present villages, were built about 1400; in the case of Oraibi, alone, the original site has been occupied ever since.

Thus the early work of 1928 indicated that available Hopi beams were not sufficiently old to link definitely our two tree-ring chronologies (see page 769). The question was, Where should we next look for some older locality whose building period preceded that of Oraibi—in short, the locality from which the Hopi Indians had last migrated?

FRAGMENTS OF POTTERY PROVIDE A PRICELESS CLUE

To answer this question a survey was made of that area known archeologically to have been inhabited by the Hopis in pre-Spanish times. Fragments of pottery were collected at each important ruin; from the shards a sequence of development was obvious. Black-on-white and a form of red ware began in very old times. Then the red changed into a polychrome-on-red. Later the beautiful yellow Hopi pottery began to appear. The development continued with improving fineness of decoration until interrupted by the Spanish influence. Then pottery-making fell into a decline which lasted until about 1897, when Nampeyo (see illustration, page 742) saw her opportunity to inspire a revival of the art.

Photograph by Neil M. Judd

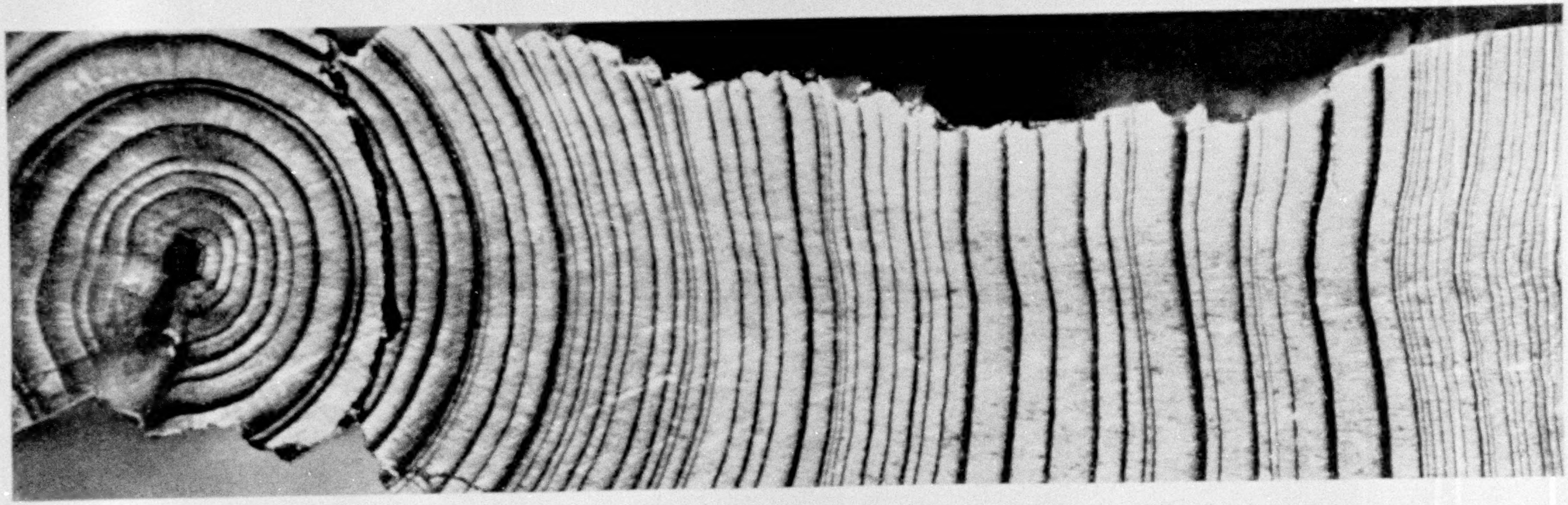
BETATAKIN, IN THE CANYON COUNTRY OF THE NAVAJOS

To this old stronghold of vanished cliff-dwellers, restored by Mr. Neil M. Judd in 1917, beam hunters went in quest of tree-ring testimony. The ruins yielded timbers which showed that Betatakin was occupied as early as 1260 (see upper illustration, page 760).

The relationship between the latter years of the prehistoric and the earlier years of the historic chronologies to this sequence of pottery types was easy to determine. Pueblo Bonito, in New Mexico; Keet Seel, near the northern border of Arizona; and Turkey Hill Pueblo, near Flagstaff, had given final building dates covering the late prehistoric chronology. Their pottery, therefore, would necessarily belong to the prehistoric period. It had not developed beyond a polychrome-on-red. But Kawaiku, which has given numerous historic building dates from 1357 to 1495, showed not only polychrome-on-red but, in addition, Hopi yellow ware in great abundance, with both primitive and late designs.

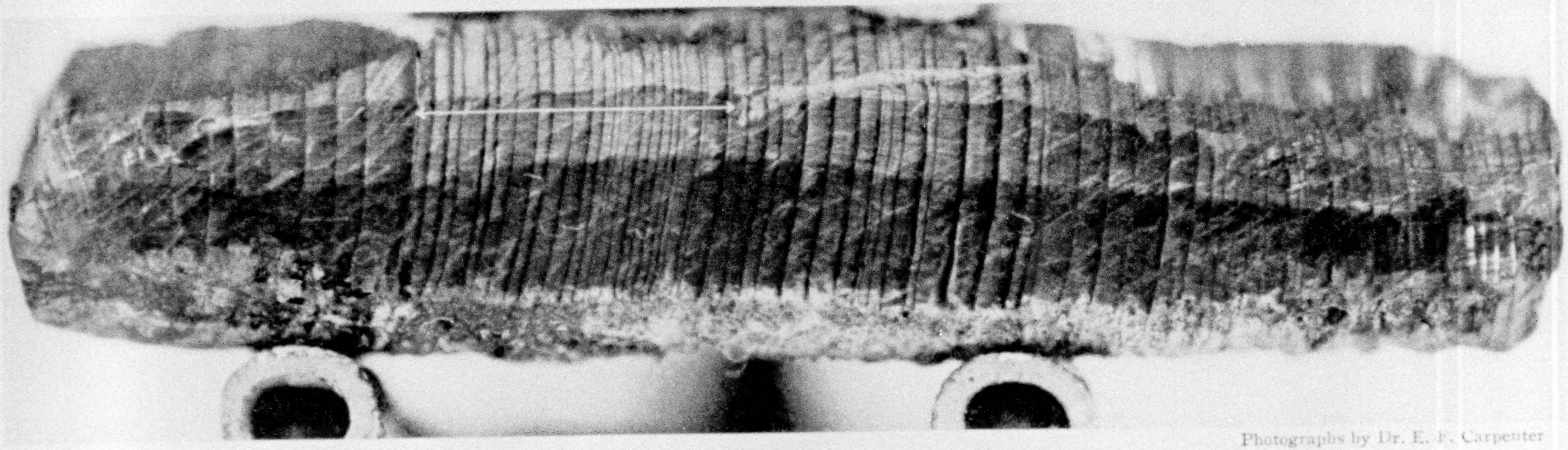
Evidently the point where the two sequences could be joined was close to the latest use of polychrome-on-red and the earliest development of Hopi yellow.

Not until the preliminary work of 1929 did we recognize that a transition orange color, which could be depended on as



A CROSS-SECTION OF A DOUGLAS FIR LOG THAT HELPED MAKE HISTORY

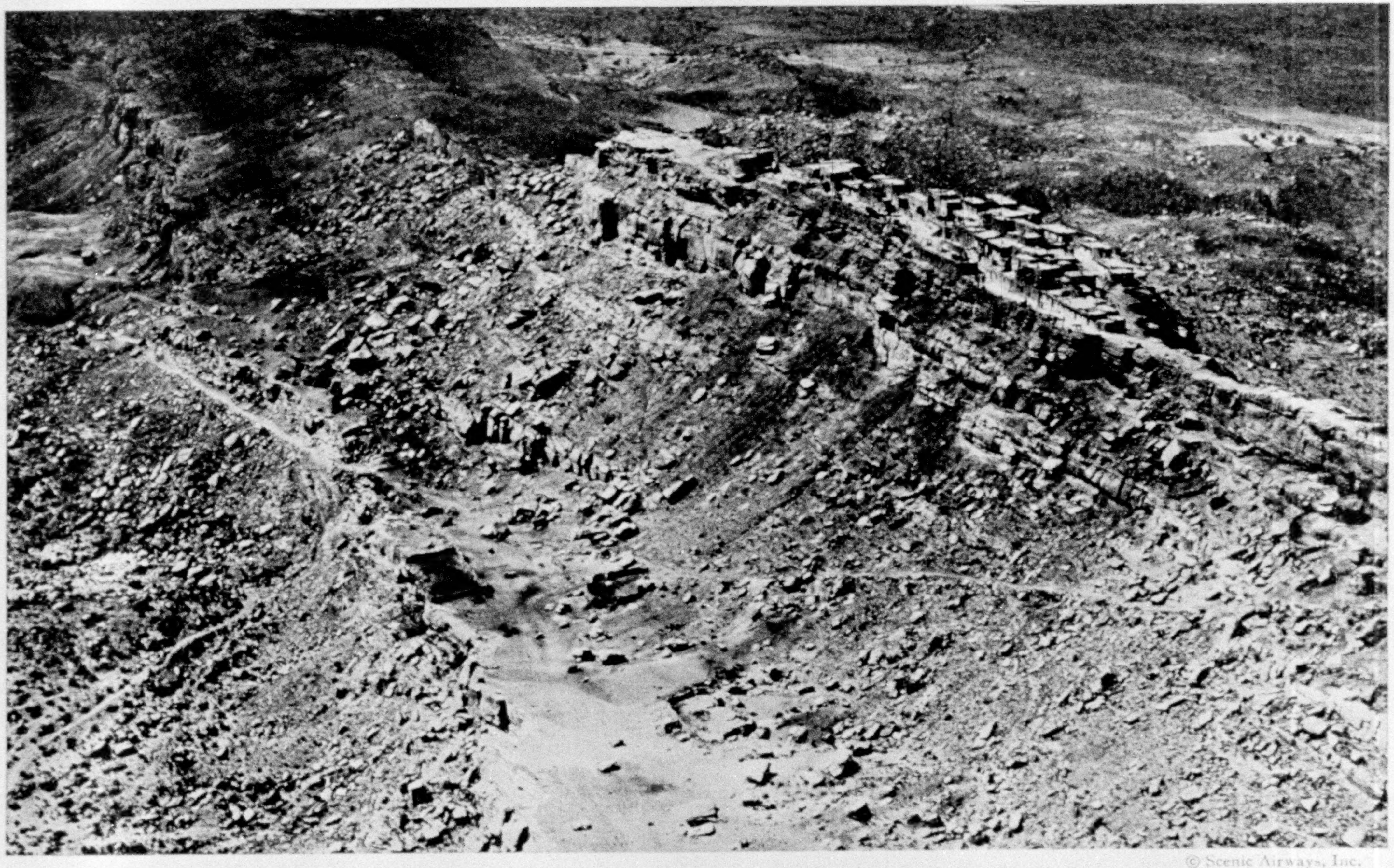
In the search for beams that would tie together the tree-ring stories of Pueblo Bonito timbers and those of living trees, this one found in Betatakin Ruin (see text, page 750, and illustration, page 759), proved to be a missing link that bound the 586 years of the prehistoric chronology together. Its rings show that it started its career in 1073 and was felled A. D. 1260



Photographs by Dr. E. F. Carpenter

A TIMBER TALE OF FAT YEARS AND LEAN

This is an enlargement of a 3½-inch core cross-section of a beam taken from the old house at Oraibi (see, also, illustration, page 746). In the thin group of rings at the left center is revealed the story of the tree's hardships during the great drought between 1276 and 1299 (see text, pages 742 and 754).



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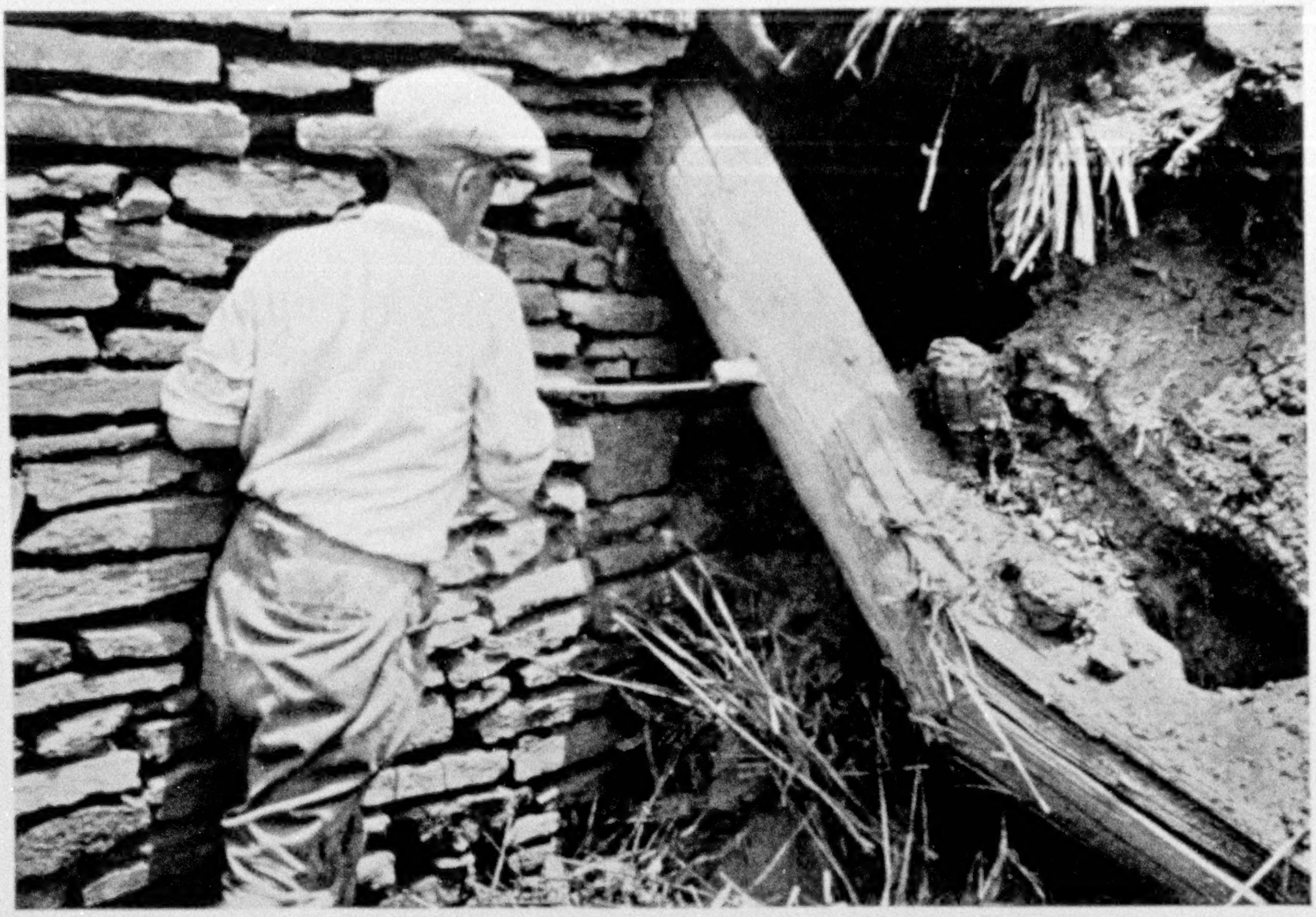
FAR UP ON THESE CLIFFS OF NORTHERN ARIZONA THE HOPIS LONG AGO BUILT THEIR TOWN OF WALPI, STRATEGICALLY LOCATED FOR DEFENSE (SEE, ALSO, PAGES 744 AND 745)

Walpi means "the place of the notch." The ancestral Hopi clans who first settled here built their homes below the site of the present village.



Photograph by J. C. Clarke

EXTRACTING A CORE FROM A LOG AT WUPATKI

When impracticable to cut a cross-section from a log, the necessary data which its tree rings record can be obtained by drilling the beam and removing the core (see page 760).

pottery of the linking era, came between the red and the yellow. This was an important guide in the selection of ruins for our subsequent search.

A BIT OF CHARCOAL GIVES A VALUABLE DATE

When I first became interested in the possibility of dating prehistoric ruins through tree rings I was very particular as to the specimens worth looking at. I told the archeologists that only pine beams six inches or more in diameter and in good condition could be used, and it is true a large number of first-class specimens enriched our collections. Then, to extend the known chronology, specimens were accepted in poor condition.

But many of the sections from Pueblo Bonito were burned; we had to find a way successfully to treat charcoal. At first frail specimens were dipped in melted paraffin. Later, this method was improved upon: the fragments were soaked in a solution of paraffin and gasoline. This solution we now keep on hand, and fragile pieces are immersed in it as soon as they come out of the ground, or, if not, they are kept covered by fresh earth until they can be put in the solution. If the pieces are apt to fall apart they are tied with string and then soaked.

The first specimens from the Jadito Valley ruins were mere chips scratched from old débris heaps near the mesa edge. These were brought to me with misgivings, for many were only as large as one's thumb, and a little pressure would crush them to powder. But, to my surprise, we found in some bits a series of rings closely resembling those between A. D. 1365 and 1420. These pieces came from Kawaiku.

I attached a high degree of importance to this dating, and yet refused to rely upon it completely because too much depended on it; for, if correct, it would be the first pre-Spanish ruin in the southwestern United States to receive an actual and exact date.

Absolute certainty was finally obtained in a piece of charcoal as big as one's fist, found in an old kiva at Kawaiku. The rings looked favorable; we carefully bound the fragment and soaked it in the paraffin

Photograph by Dr. A. E. Douglass

THE FIRST BEAM EXPEDITION FINDS A TALKATIVE TIMBER

From this modern house at Sichomovi beam hunters took a specimen whose tree rings show that it was cut by Indians nearly 100 years before Columbus reached the New World.

solution. Subsequent examination showed that the rings could be followed from center to outside, and they gave an absolutely perfect sequence from 1400 to 1468, as reliable as if they had been dated at the time and sworn to before a notary. This established conclusively the correctness of all the other dates which had been obtained of approximately that same period.

KAWAIKU OCCUPIED BOTH IN HISTORIC AND PREHISTORIC TIMES

Then other specimens came to light, carrying our ring sequence back to 1300 and forward to 1495, and showing that new dwellings were erected in this village shortly before the first Spaniards, Pedro de Tobar and Fray Juan de Padilla, reached Awatobi in 1540.

A group of wood fragments in another place showed a series of cutting dates from 1357 to near 1400. At the same time, a bit of pine built into the wall as a door lintel gave a very dependable late prehistoric date for the original walls.

Thus we had ample evidence that Kawaiku was occupied both in the latter years of our prehistoric sequence and the earlier years of our historic chronology. Hence this ruin, or one of its neighbors, gave promise of being a desirable site in which to search for those particular rings that might unite the two series. No doubt the desired wood was here, but the ruin covered some nine acres and it would be difficult to say where that wood could be found.

We were far from discouraged when our second expedition closed without having contributed any appreciable results toward the linking of our two chronologies. The one Oraibi specimen (see text, page 754), whose center was at A. D. 1260, was of the utmost importance, but it was all alone and covered a period of time from which surviving timbers were few and usually badly defective. Yet the prospect of ultimate success in tying them together seemed brighter than ever! By the spring of 1929 we were convinced that our pottery sequence could be used as a reliable guide in finding ruins of the desired period.

Of course, the question arose: Could the needed specimens even now be on our shelves? An illustration of how unsuspected treasures may pass unregarded, even in the ring student's laboratory, is afforded by an incident of the preceding year. On my first visit to the National Geographic Society's excavations at Pueblo Bonito, in 1922, Mr. Judd gave me, among other pieces, a very fine section from a horizontal wooden base supporting a ceiling log in one of the large kivas. At that time the specimen disclosed nothing I could recognize. I put the whole group of 15 specimens to one side, as not revealing anything of importance.

Five years later I undertook a reëxamination of them in the light of some other material with which I was working. Then it was that this section of the horizontal wood base became eloquent with its story. It covered an entirely new century and extended the prehistoric chronology backward 107 years. It showed that the tree from which it was derived had been cut when it was approximately 337 years old.

Recollecting this case, I repeatedly examined all material that might help unite the two chronologies, but failed to discover anything not previously disclosed.

WUPATKI AND PUEBLO BONITO BUILT WITHIN 70 YEARS OF EACH OTHER

That the conclusions of competent archeologists were dependable as to the probable decades in which the two sections of our calendar would join may be illustrated by another experience. About 35 miles northeast of Flagstaff there is a fine old ruin known as Wupatki. I asked one of my archeological friends his opinion as to the relative ages of that ruin and of Pueblo Bonito. He replied that such evidence as he had examined indicated that they were of approximately the same age. When I examined timbers from the two ruins in my laboratory and applied the usual methods of dating, I found that the old village on the slope of San Francisco Mountain, in Arizona, showed a building date only 70 years after those of the more famous pueblo in Chaco Canyon, New Mexico, 220 miles away.

What then was the next step? We had identified a locality in the Jadito Valley which was apparently inhabited during portions of our two time periods and presumably through the years that linked them together. Other Jadito ruins, especially Kokopnyama, seemed favorable and equally likely to contain material covering this period. But each of these ruins was nearly ten acres in extent and we were without any means of knowing just where to dig.

Probably beams at a depth of 10 feet or more were in good condition, but a search for them would mean deep, long-continued excavation. Nearer the surface, timber of the age which we desired would be badly decomposed unless previously burned by fire. Hence evidence of rooms destroyed by fire was the essential clue in future work. Several of the ruins south of Holbrook gave indications of being near the right age and were in the midst of the pine forest. Their colder climate and the abundance of freely burning wood made charcoal far more likely to be found there in quantity.

SHOWLOW RUIN OFFERS BRIGHT PROSPECTS

These considerations provided a background on which to plan the third expedition. In the early spring of 1929 a reconnaissance was made of the pre-Spanish Hopi region where orange-colored pottery or its imitations were found. After excluding wonderfully interesting sites along the Little Colorado River, four ruins—Kokopnyama, in the Jadito Valley; Kintyel or Wide Ruin, to the southeast; Showlow and Pinedale, 100 miles south, in the great pine forest of the Mogollon Rim—were selected for examination.

Of these, the Showlow and Pinedale ruins made the stronger appeal because of their proximity to growing pines. Even between these two, first choice went to Showlow because from it pieces of charred wood had already been reported. When a fire occurred in this communal dwelling and some of the ceiling beams began to burn, the walls evidently collapsed and smothered the flames, thus converting some of the timbers into charcoal which has resisted decay.

This wood was finally examined in the new laboratory of the Association for Research of the Southwest, by courtesy of Mr. Harold S. Gladwin, Director, and clearly pointed toward Showlow as the place where the material should be found which would unite our chronologies.

Mr. Hargrave and Mr. Emil W. Haury left Flagstaff on June 11 to begin work at the Showlow ruin, while I remained behind to set up a temporary laboratory in quarters which Dr. Harold S. Colton, the Director of the Museum of Northern Arizona, kindly placed at my disposal.

Help was obtained for unpacking and dipping the specimens in liquid paraffin as they came in. Material arrived rapidly from the Showlow party. Among the first important specimens were portions of several logs, in the form of charcoal, of course, which showed dates in both the historic and the prehistoric series.

A NOTABLE FIND IN THE MIDST OF A RUBBISH HEAP

After getting the ring sequence from those logs, Mr. Judd and I left Flagstaff early Saturday morning, June 22, for Showlow. When we arrived there, shortly before noon, we found that another log had just been discovered at the extreme north end of the ruin. It had been found only a foot below the present level of the ground, in an area, however, from which earth had been removed in recent years.

Photograph by O. C. Havens

CHARLIE PINTO, A ZUÑI WORKMAN AT PUEBLO BONITO

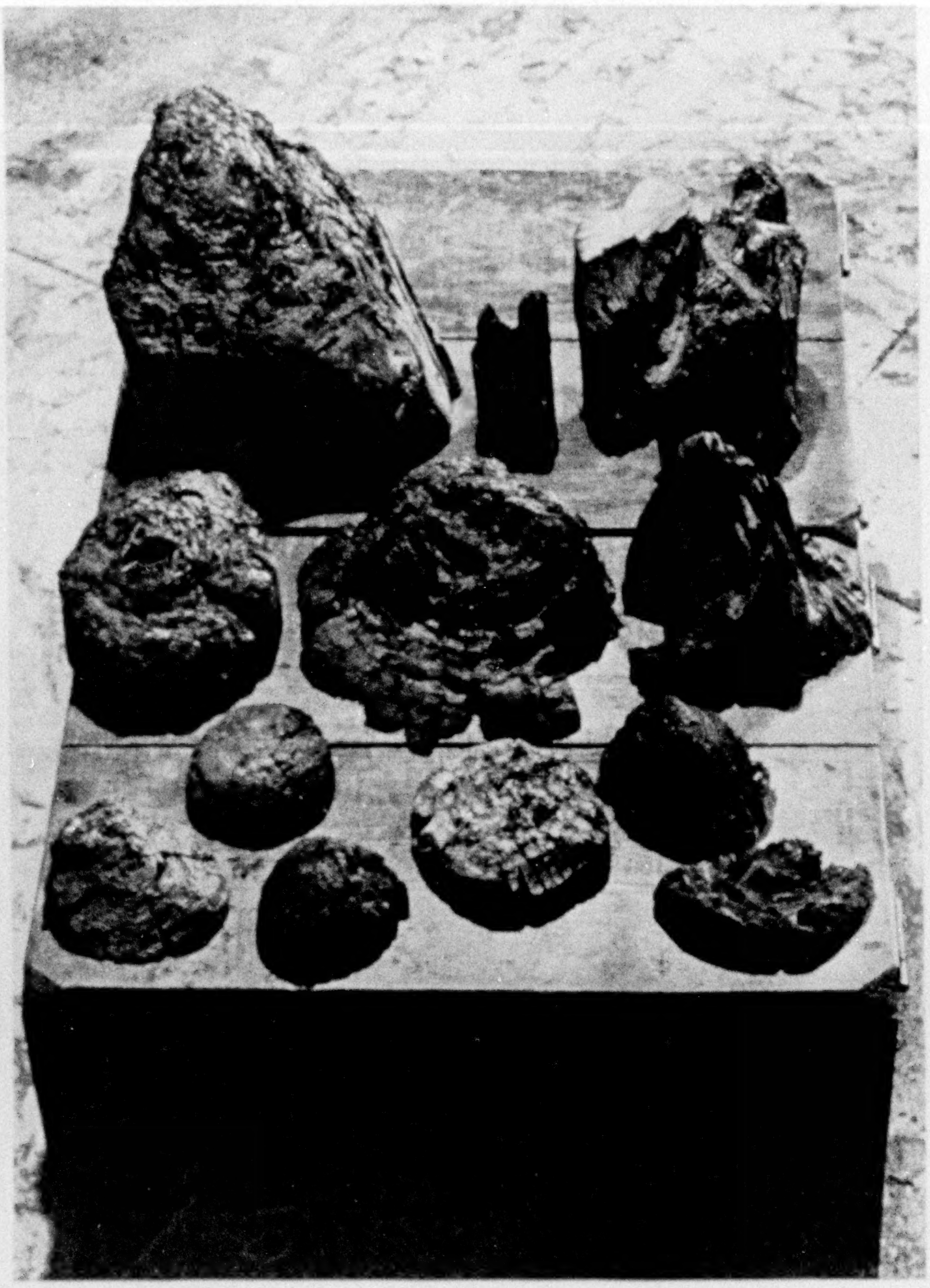
The Zuñi tribesmen have been capable assistants on the National Geographic Society's numerous expeditions in the Southwest. They are good-natured, quiet, and industrious and strict conformists to their ancient religion.

The general area in which the men were working is one where modern things intermingle with ancient ones. There are 20th-century houses, cisterns and stone walls, barns, chicken yards, and fences covering the site of what remains of the prehistoric buildings, most of which were razed many years ago.

Furthermore, Mr. Edson Whipple, who owns the larger part of the property, had overturned every room in the old village in his search for primitive pottery and the extension of his gardens over leveled masonry and crumbled walls.

Our men, therefore, in their search for fragments of charred beams, found at every turn the discards of 19th and 20th century culture—here a piece of packing box, there a beef bone with sawed ends, and elsewhere a broken pickle bottle or the top of an old tin can.

But it was easy to note the difference between prehistoric wood and modern fragments. The old timbers had disappeared entirely except in the form of charcoal or near-charcoal. Some of the frag-



Photograph by Dr. A. E. Douglass

ANCIENT STONE AXES CHOPPED THESE ROUGH BEAM ENDS

The work of estimating the age of beams is often expedited by examining their ends. From Mexican traders of the 17th and early 18th centuries, the Hopis acquired sharp-bladed metal axes and soon many Indians forsook their dull stone implements and acquired the white man's tool. These beam ends—natural wood, not charcoal—reveal the dull, mashing blow of the thick-edged primitive stone ax.

ments we recovered had, in their charred form, survived the centuries, but still showed that they had been patiently worked smooth with sandstone rasps by Indians of the long ago.

BEAM HH39 PROVES TO BE THE LONG-SOUGHT KEY

But among the valuable material we found at Showlow first place must go to the log taken out just after Mr. Judd and I arrived. It was found in a horizontal position and resembled an ordinary round beam which had been burnt off at the end in the form of a cone, as is common with burnt logs.

As a precautionary measure for holding it together, we bound it carefully with cotton twine; but, even so, the specimen fell to pieces, and not until then did we discover that our supposedly solid log was merely a conical shell of charcoal and near-charcoal from which most of the wood untouched by fire had decayed.

But, for all that, it was clearly a fragment of exceptional value. We gave it the field number HH39 (see illustration, page 769), after which I commandeered Mr. Whipple's old tool house and spent most of the afternoon working on it there.

Its outer parts were at once recognized as belonging to the 14th century, rings being traceable nearly to A.D. 1380. The record it gave us after 1300 was absolutely satisfactory, with no question whatsoever remaining as to the dating.

Following its rings inward to the core, we saw the record of the great drought. Here were the very small rings that told of the hardships the tree had endured in 1299 and 1295. As we studied the rings further toward the center, 1288, 1286, 1283, and 1280 each told the same story we had found in other beams of lean years and hard living. Also, there were the years 1278, 1276, and 1275, the ring for each corroborating the diary entries other logs had given us.

Then came the years of the seventh

decade of the 13th century, and the stories told by their rings agreed in every detail with those told by the rings for the same years in the Oraibi beam (see text, page 754).

But whereas the Oraibi beam could tell us nothing back of 1260, Showlow's HH39 did not stop there. Here was its account of 1258, a hard year, and of 1254, an even harder one. Presently it told of 1251 and 1247, years when all the trees were singing "How dry I am."

We were getting down close to the center now. But the rings were clear and easily understood. Finally came the one at the very core, and from its central ring (see illustration, page 769) we learned that this charred old stick began its life as a promising upright pine A. D. 1237, just ten years after the Sixth Crusade moved eastward to compel the Saracens to restore Jerusalem.

NOT A GAP BUT A BRIDGE

The history within that carbonized bit of beam held us spellbound; its significance found us all but speechless; we tried to joke about it, but failed miserably. We felt that here was the tie that would bind our old chronology to our new and bring before us undreamed-of historic horizons.

Later that evening we gathered under the spluttering old gasoline torch in the village hotel, and beneath its flickering light, by the use of my skeleton plots of prehistoric tree rings, we began to determine whether our historical chronology, now extended back from 1260 to 1237 by Beam HH39, might not overlap the old chronology.

As we studied these rings the answer came. The ring in our old chronology that represented its 551st year matched perfectly with that of the ring for the year 1251 in Beam HH39. And then our big surprise! We had not a gap to bridge, as we had thought, but one we had closed without knowing it!

Our two chronologies had covered an overlapping period. But those rings of the old series which overlapped the new at 1260 had been gathered from such small fragments that I had never been willing to accept their evidence as to this overlapping. To be sure, I had dwelt upon this possibility at times, but always rejected it as unconvincing. It was Beam HH39 that cleared away all doubt.

Even after our evening's study I wanted to make further examination of one or two rings at the uncertain extremes of my two chronologies; but to my colleagues I declared that the coincidences were so striking and the situation looked so cheerful that, at such a late hour, we could well afford to sleep upon it.

But I could not sleep. Lying awake, I visualized all the individual rings concerned in this agreement and became completely satisfied that the relationship between our prehistoric and historic ring records had been definitely ascertained.

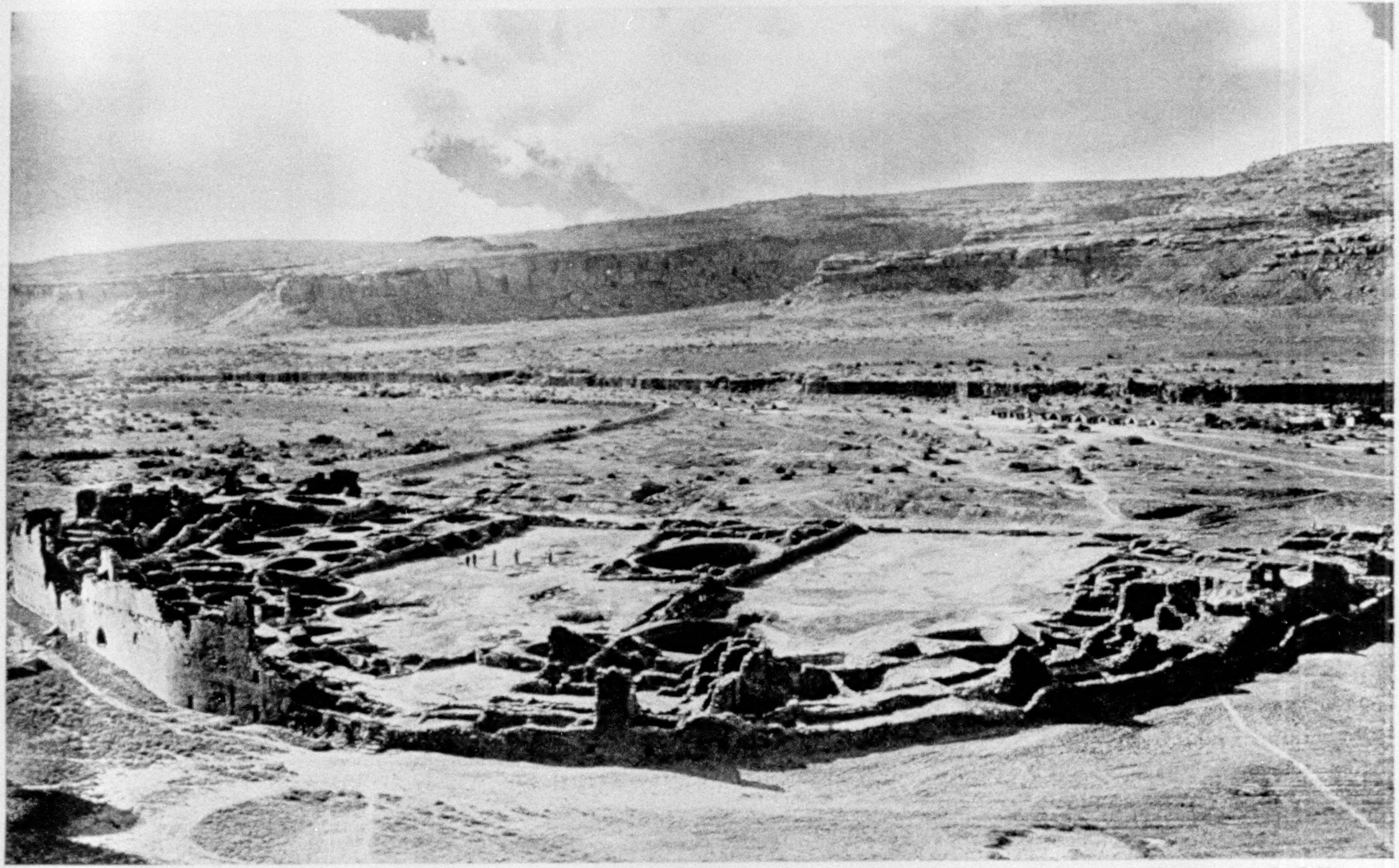
It still remained to examine with even further care the rings recording the great drought in the late years of the 13th century to see if by any chance anything had been overlooked. It would be necessary to prepare a complete photographic record of rings from the beginning of Pueblo Bonito chronology down to the present time; also, a complete review must be made of some 5,000 beam fragments, charred and otherwise, to get the various building periods in the 40 ruins from which they had come.

PUEBLO BONITO REACHED ITS HEYDAY IN 1067

But when I finally went to sleep it was with the consciousness that my old chronology had begun A. D. 700; that the earliest beam we had recovered from Pueblo Bonito had been cut A. D. 919 from a tree that was 219 years old when cut; that Pueblo Bonito had reached its golden age in 1067 and was still occupied in 1127.

The next morning I returned to our beams. More deliberate study added new strength to their story. The years between 1260 and 1295, the earliest in the historic chronology, had been dated by the Oraibi log alone; likewise the late years of the prehistoric sequence had many defective rings in the great drought period which ended it. It had been the uncertainties arising out of these conditions that had made impossible the determination of the overlap without additional beam material.

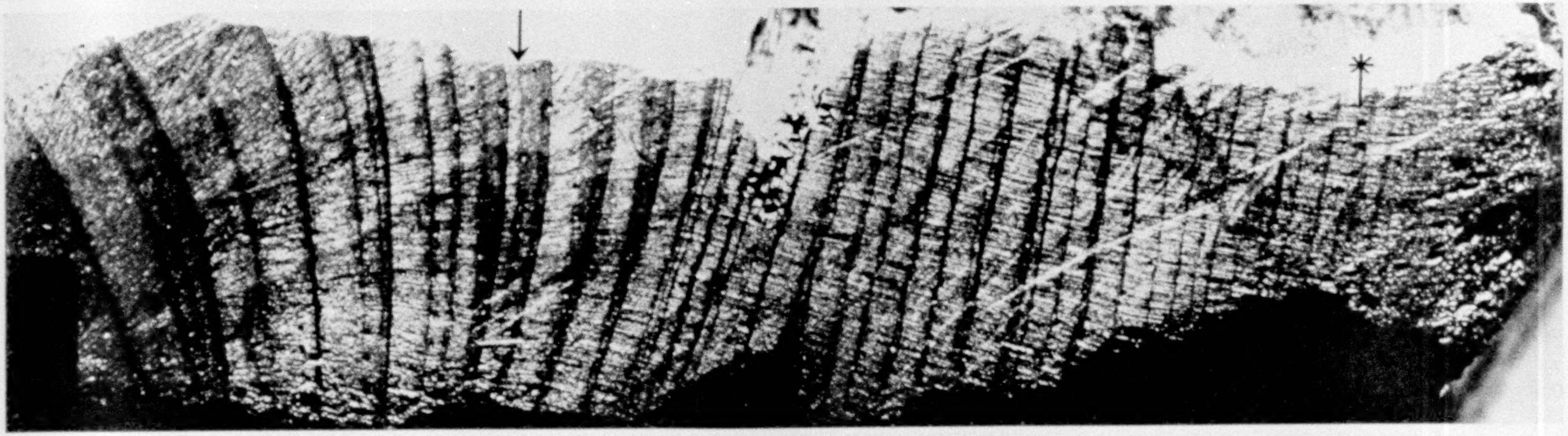
But when we found Beam HH39 it proved to be the bridge over which we could pass the deep chasm of remaining



Photograph by O. C. Havens

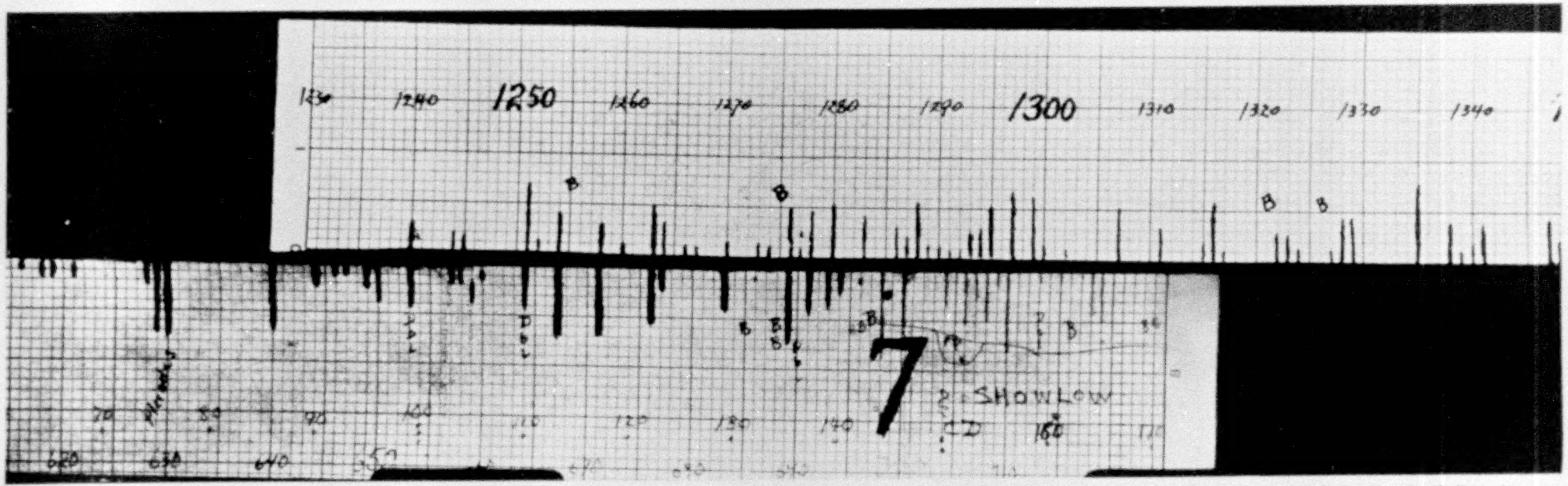
A PANORAMIC VIEW OF PUEBLO BONITO, EXCAVATED BY NATIONAL GEOGRAPHIC SOCIETY EXPEDITIONS

These ruins, set apart as the Chaco Canyon National Monument by President Roosevelt, are the oldest definitely dated pueblo remains in the American Southwest. The colossal communal dwelling was under construction in 919 and the settlement had reached its heyday in 1067 (see text, page 767).



THE KEY TO THE SECRET OF THE SOUTHWEST—CHARRED RINGS OF BEAM HH39 (SEE TEXT, PAGES 767-770)

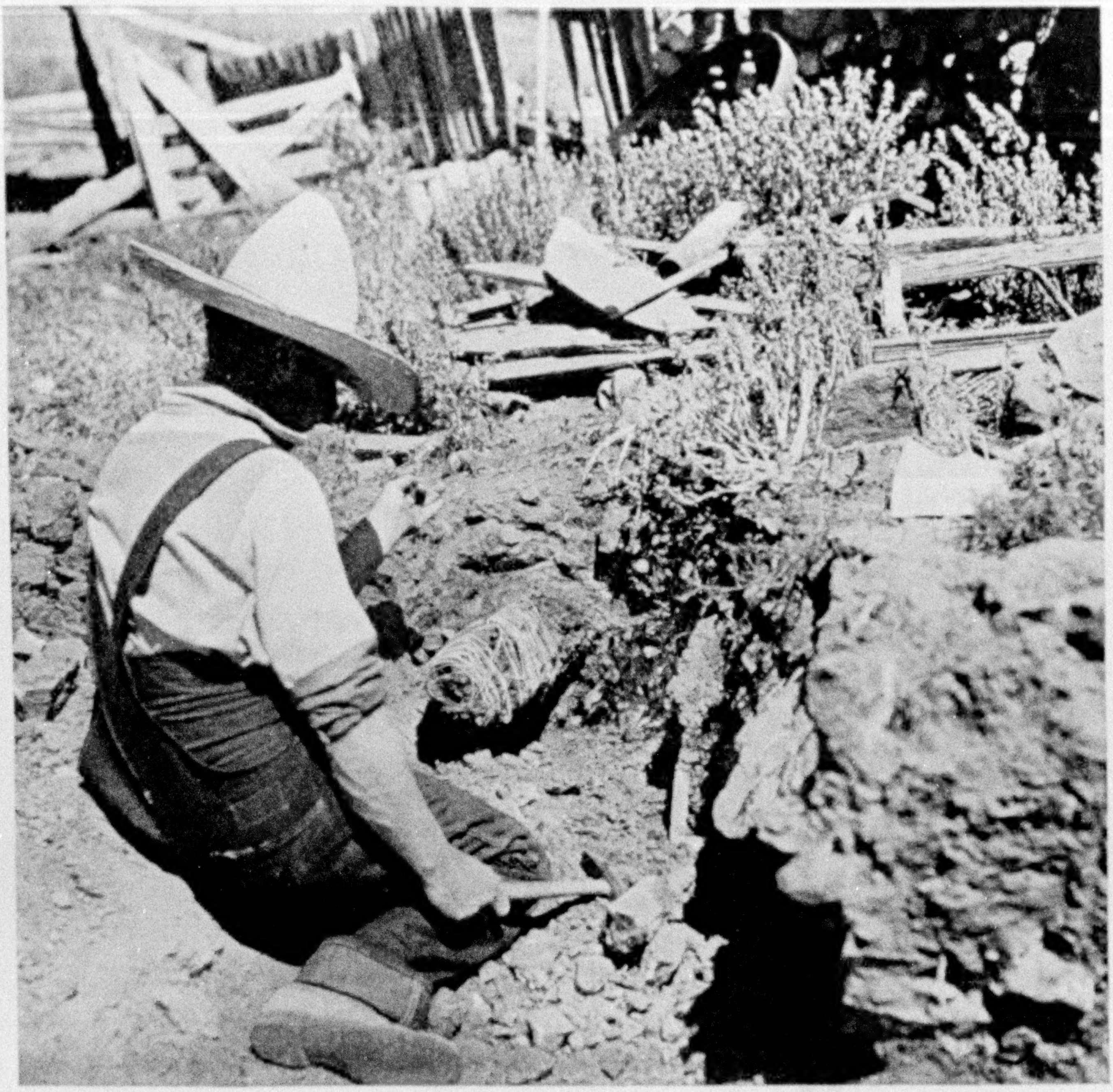
This fragment, photographed in reflected light, shows some of the pre-Columbian tree diary entries. The ring indicated by the arrow records rainfall conditions in 1247; the one designated by a star tells of conditions in 1275. The closeness with which timbers of the same age corroborate each other's testimony about common experiences would delight a trial lawyer's heart.



Photographs by Dr. A. E. Douglass

MATCHING THE STORIES THE TREE RINGS TOLD

To make them readily accessible for comparison, one with another, each tree-ring specimen was carefully plotted. The long black lines on these original field records represent severe drought years; the shorter ones, less severe drought years. The lower plot, of specimen HH39 (see above) from Showlow, brought joy to the expedition members when its principal drought years were found to coincide with those in the upper plot, made up of timber records previously dated.



Photograph by Neil M. Judd

THE RESCUE OF THE "ROSETTA STONE" OF AMERICAN ARCHEOLOGY

The end of Beam HH39, found at Showlow Ruin, was carefully wrapped with twine until the whole charred log could be uncovered and taken out (see text, page 766).

uncertainty. Its respective ends, figuratively speaking, rested upon staunch abutments in both the old and the new sequences.

Its inner rings overlapped the late decades of the old chronology by 49 years, the final ring resting on the year 537 of that sequence; its outer ones overlapped the earliest 120 years of the new, the last one reaching to 1380.

Thus the 26 years from 1260 to 1286, which had belonged to both chronologies, were definitely matched and their union confirmed by Beam HH39, which in American archeology is destined to hold a place comparable to Egypt's Rosetta Stone.

The successful dating of the many ruins of the pueblo area that this research has made possible (see map, page 743) enables us now to correlate the increases of rainfall that permitted these villages to expand and the drought years that placed upon them the heavy hand of starvation.

With careful archeological study we shall perhaps be able to trace the movements of clans and test tribal traditions which have been so often quoted as the early history of these people. In the combination of climatic conditions with tribal activities we have a rich field for studying the influence of climate on human history.

THE SOCIETY'S NEW MAP OF EUROPE

By Gilbert Grosvenor, LL. D., Litt. D.

President of the National Geographic Society

A NEW Map of Europe in 46 languages—such is the supplement which comes to the members of the National Geographic Society with this December issue of their Magazine. It is the first wall map published in the United States which shows in any considerable detail, and with consistency throughout, the geographical place names of the many nations of Europe and the Near East, spelled according to their local official forms. It represents more than three years of work in compilation, selection of names, drafting, engraving and printing, and, including the cost of its distribution to each of The Society's 1,300,000 members, an expenditure of more than $200,000.

Immediately following the signing of peace treaties, which established new national boundaries in Europe after the World War, the National Geographic Society issued to its members a new map of Europe as a supplement with the National Geographic Magazine for February, 1921. In the ensuing nine years one of the most notable changes that has taken place in Europe has been the development and intensification of national feeling with respect to geographical place names.

The Polish people, for example, insist that their capital be recognized by their own name for that ancient city—Warszawa, not an Anglicized Warsaw; the Estonians demand Tallinn, not the prewar nomenclature, Reval, for their chief city; the Russians have supplanted St. Petersburg and Petrograd with Leningrad.

And so, over the whole face of Europe, new forms for old, or, more properly in many cases, older forms for old, have been established on the official maps of each nation.

THE NEW MAP WILL PROVE A BOON TO TRAVELERS

Doubtless many thousands of our readers, when traveling in Europe, have found difficulty in identifying the names of towns as spelled in the railway time-tables, or at the railway stations, with the places on the American or English maps which they were carrying. But this embarrassment will not occur when using the National Geographic Society's New Map of Europe, as our spelling of place names accords with local usage.

Every person expects others to spell his or her name as he or she spells it, wherever he or she may happen to be. Courtesy and custom will soon require that when we write to our friends in Europe we spell the names of their cities as these names are spelled at home.

The National Geographic Society has 50,000 members in Europe. Communications coming to these members from the National Geographic Society addressed to Rome (Roma), Venice (Venezia), etc., would probably seem to them as illiterate as we regard letters coming to us addressed to Nuova York, Filadelfia, Salzseestadt (Salt Lake City), or Waszyngton, which is the manner the names of a few of our cities are spelled in some European gazetteers.

MANY MAP NAMES UNFAMILIAR TO AMERICANS

Foreseeing the ultimate desirability of according to each nation recognition of its own approved geographic names within its boundaries, the National Geographic Society three years ago began to assemble the data for and to construct the present New Map of Europe. Some months after The Society's cartographic department had begun its work, the United States Geographic Board officially adopted the general principles of nomenclature upon which this map was then being constructed.

Many of the names on our map will have an unfamiliar appearance to the average user, and yet these are the place names to which letters should be addressed; they are the names which the traveler abroad will find on his time-tables of the various countries; and they are the names which will greet his eye as his train or boat or airplane passes station, dock, or landing field.

Wherever space has permitted without the sacrifice of legibility, the conventional Anglicized forms of commercially important or historically significant places have been included, in parentheses, but where only one name could be shown, the local official form is given.

As a convenience to the average English-speaking user of the map, the conventional Anglicized names of the countries themselves have been retained, for it would be too radical a departure from tradition and practice to expect one readily to identify "Shqipënië" as "Albania," for example. Usage will doubtless some day make it feasible to adopt generally on our maps the official names of countries as well as the cities and towns—Norge (Norway), Sverige (Sweden), Suomi (Finland), Deutsches Reich (Germany), Österreich (Austria), etc.

The official names of countries and their English equivalents are given in a table in the upper left corner of the map. The same table gives a useful series of geographical equivalents—words descriptive of physical or cultural features frequently used as integral parts of geographic names. For example, the Turkish word for river is *ırmak*. It is often combined with the proper name thus—Kızılırmak (Red River). It would be as tautological to refer to the Kızılırmak River (Red River River) as to speak of the Rio Grande River (River Grand River).

This table of equivalents will be found much expanded in the Index to the Map, more than 100 such words being included, with the countries in which they are used clearly indicated. Thus we have a key to the frequent occurrence of such terminologies as *hamina, hamn, haven,* and *havn* in northern Europe. Each means harbor in the country where it occurs—Maarianhamina, Nynäshamn, Bremerhaven, København.

Where a body of water borders several countries and each country has a different name for the same physical feature, the Anglicized form is given on the map, but each nation's official name for it is given in the Index to the Map of Europe, which may be obtained separately. For example, Baltic Sea is shown on the map, but separately and alphabetically listed in the Index are the names Östersjön (Swedish), Ost See (German), Balti Meri (Estonian), Baltijas Jūra (Latvian), Baltijos Jūra (Lithuanian), and Morze Bałtyckie (Polish). In cases where rivers flow through several countries the official name in each country is given, and the Anglicized name is shown in parentheses.

EMBASSY AND LEGATION OFFICIALS HAVE COÖPERATED IN COMPILING THE MAP

In compiling material for this map, the National Geographic Society has had courteous coöperation from many sources. Without exception, embassy and legation officials of every European country represented in the National Capital have assisted The Society in obtaining their most recent authoritative national maps.

In addition, geographical societies abroad have been consulted and have given valuable suggestions as to the choice of place names to be shown in congested areas. It not infrequently happens that while one city may have a slightly larger population than another, it is desirable to show the smaller city because of historical, strategic, or commercial significance.

On a map of the whole of Europe, where there are greater variations in density of population than in any other area of equal extent on earth, the problem of indicating the relative size of towns by the style of lettering was an extremely difficult one.

The solution adopted has been to show all cities of more than a million inhabitants by a shaded area instead of with a place mark, as in the case of Paris; towns of from 500,000 to 1,000,000 inhabitants are indicated in the type used for Marseille; towns from 100,000 to 500,000 are shown in the type used for Bordeaux; from 20,000 to 100,000, the type is everywhere the same as that used for Brest, and for towns of less than 20,000, lightface sloping letters are used, as in Château-Thierry.

TURKEY'S NEW ALPHABET USED

The National Geographic Society wishes especially to acknowledge the generous coöperation of the American Ambassador to Turkey, Mr. Grew, whose staff induced Turkish authorities to prepare preliminary lists of new place names in the New Turkish alphabet * prior to the official promulgation of those names. The Turkish portion of the map had been completed when news came from The Society's European staff representative in Constantinople that the new alphabet would be adopted. This entire section of the map had to be relettered.

In the past it has been the general policy of American map-makers to disregard diacritical marks; but, with the adoption of official forms in countries where such marks entirely alter the phonetic value of a letter, it has been necessary to employ them. For instance, the New Turkish alphabet consists of 29 letters, if the Ğ (with diacritical mark) is considered as a separate letter. Q, W, and X are omitted and the consonants Ç, Ş, and the vowels I (without dot), Ö, and Ü added.

It is a peculiarity of the New Turkish that the C (without cedilla) represents the sound of the English J. In no other language does the letter C represent this sound. The Ç (with cedilla) has the value of the English Ch and should not be confused with the French and Portuguese S sound. Thus, the former spelling Chatalja becomes Çatalca. The letter Ğ chiefly takes the place of the former Gh, as, for instance, in Boğaz içi (Bosporus). Ş has the same value as the English Sh. Thus we have Akşehir for the former Ak Shehir. The I without dot (capital and small letter) is pronounced like U in But, while with the dot (both over the capital and small letter) it takes the sound of I in Miss. The Ö and Ü have the German values. These are the most important features of this new transliteration system, and by keeping in mind these values the reader may convert the majority of the New Turkish names into the familiar old forms.

LETTER-FOR-LETTER TRANSLITERATION OF RUSSIAN NAMES ADOPTED

Great confusion has existed for years in the spelling of Russian names, chiefly because map publishers have attempted in many ways the almost impossible task of transliterating the Cyrillic alphabet into equivalent Latin alphabet values. The National Geographic Society in 1921 adopted the policy of a strict letter-for-letter transliteration. Thus Kiev was used in preference to Kief or Kieff; Kishinev in preference to Kishinyof. Unfortunately, many leading cartographers, as well as the Permanent Committee on Geographical Names, London, adopted the letter J to represent the Russian sound Zh, the equivalent of French J.

As the English J represents neither the French J nor the Russian Zh, the National Geographic Society decided to restrict the use of the letter J to its proper English value, and employed Zh to express the Russian J sound. Thus we have Nizhnii Novgorod, not Nijnii Novgorod. This system was adopted in 1928 by the United States Geographic Board.

The official Great Russian spelling has been followed over the entire Soviet Russian territory of this New Map of Europe, no attempt having been made to present the Ukrainian variant or Caucasian equivalent.

DIACRITICAL MARKS SIMPLIFY EUROPEAN PLACE NAMES

While it is recognized that a "royal road" to pronunciation of geographic names does not exist, the publication of this New Map of Europe with its numerous diacritical marks makes easier a more or less general formula for correct pronunciation.

The reader is, of course, familiar with the two salient facts concerning Spanish and Portuguese names—that the nearest English phonetic equivalent of the Spanish J is H, and that the phonetic value of the Portuguese Ão is approximately aun; but it is not generally recognized that a large proportion of the sounds most difficult to the English tongue are common to several languages. Thus the French and Dutch U is equivalent to the German, Hungarian, and Turkish Ü, and to the Swedish, Norwegian, and Danish Y (as in French *tu*). The German Ö is found in Hungarian, Turkish, and Scandinavian, and corresponds very nearly to the French *eu* (like English U in Fur).

The Swedish alphabet, besides the German umlaut Ä and Ö, also contains an Å.

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* See "Turkey Goes to School," by Maynard Owen Williams, in the NATIONAL GEOGRAPHIC MAGAZINE for January, 1929.

pronounced like O in Sore. Recently the Norwegians have in many instances replaced their Aa with the same letter. The Danish-Norwegian Aa must not be confused with the Dutch-German or Finnish Aa, equivalent to the English A in Father.

NEW STATES BANISHED OLD NAMES AFTER THE WORLD WAR

After the World War the official German, Austro-Hungarian, and Russian languages were banished from the new-born States of Central Europe, with the result that Estonian, Lettish, Lithuanian, Polish, Czechoslovak, and Serbo-Croatian came into their own as official languages.

Fortunately, these nations, with the exception of the Serb (Jugoslavia), use the Latin script, but because of the numerous diacritical marks and unusual combination of consonants, pronunciation of the new names at first sight appears to be far from easy. The problem is not so great as it would seem. In Latvia, Lithuania, Czechoslovakia, and Jugoslavia the letter Š appears frequently. This represents the English Sh; but in Hungary the unaccented S, in Rumania Ş, and in Poland Ś or Sz, also represent this sound. On the other hand, the Hungarian Sz is like sharp S. The letter C in all these countries except Rumania always is pronounced Ts, but in Hungary Cz and in Rumania Ţ also have the same value.

The English Ch in Lithuania, Latvia, Czechoslovakia, and Jugoslavia is represented by Č; but in Poland Cz, in Hungary Cs, and in Rumania C (before E and I) are the equivalents of this sound.

The soft Zh (French J) is rendered by Ž in Lithuania, Latvia, Czechoslovakia, and Jugoslavia, and in addition the Lithuanian Ż, the Polish Ż and Rz, the Hungarian Zs, and the Rumanian J have the same value.

The letter J in almost all cases represents the English Y, with notable exceptions in France and Rumania. The English J is represented in Poland by Dz, in Czechoslovakia by Dž, in Hungary by Gy, and in Rumania by G (before E or I).

Poland presents a greater variety of diacritical marks than any other country, but the difficulties of pronouncing that country's place names are minimized by recalling that Ł is the equivalent of the Ll in All, although frequently pronounced like the English W. The Ó is pronounced nearly like Oo in Boot, and the W like the English V, or F at the end of a word. Thus, Sokołów is pronounced Sokowoof.

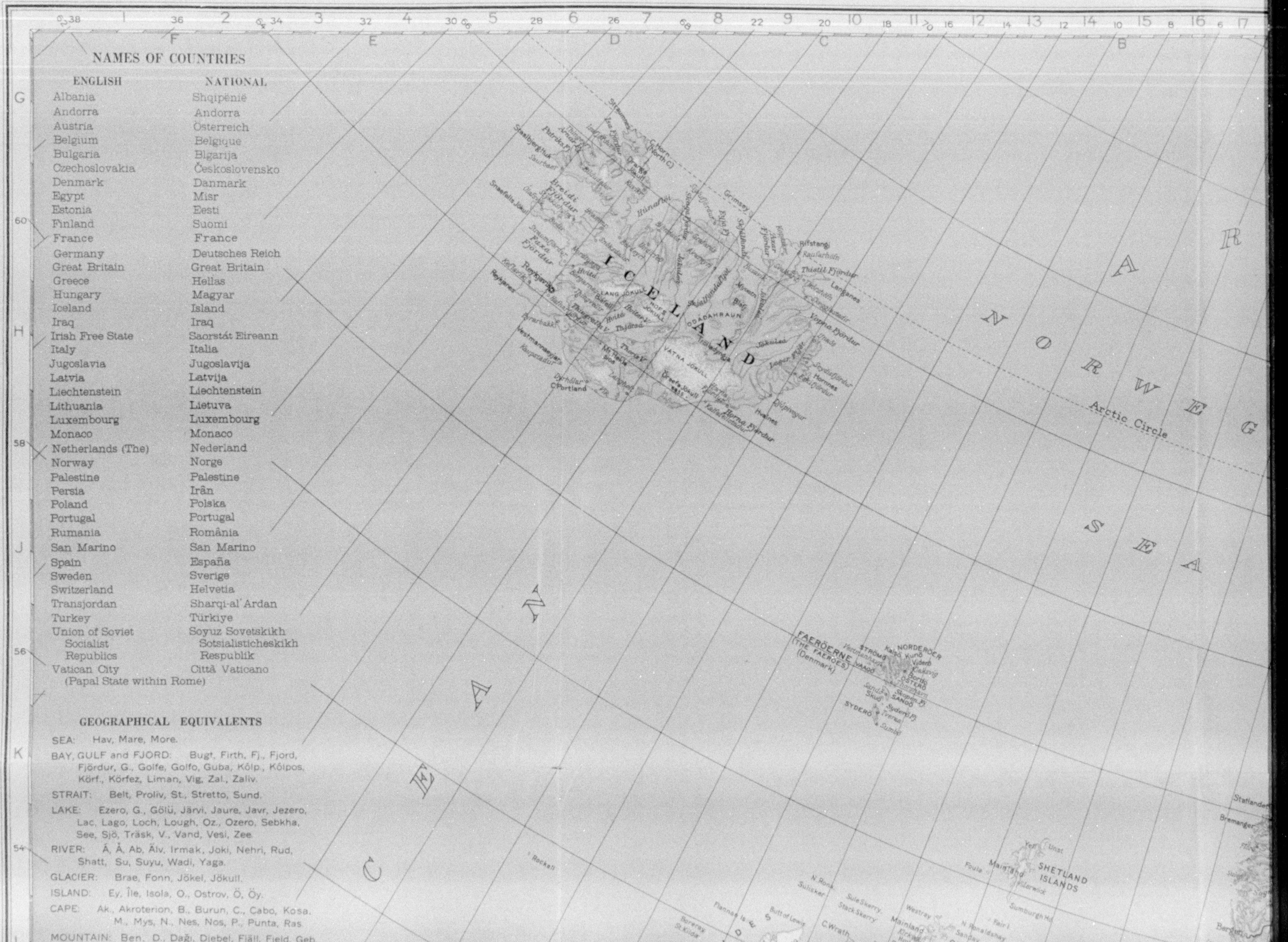
The Czechoslovak Ř is most nearly represented phonetically by Rzh; thus Přerov is pronounced Przherov.

In pronouncing Lettish, Czech, Finnish, Hungarian, and Estonian geographic names the stress is always on the first syllable and in Polish on the next to the last syllable.

A NETWORK OF AIRPLANE LINES COVERS EUROPE

The inset map showing airplane lines now operated in Europe will prove of interest to the traveler and to the student of aviation. Many of these lines are not operated in winter and most of them are maintained with the aid of government subsidies. The lines, of course, are not permanently fixed, but the map gives the user a comprehensive idea of the places to which he may travel by air. Many of the lines are operated not daily, but once or twice a week.

Additional copies of the New Map of Europe and the Near East may be obtained from the headquarters of the National Geographic Society, in Washington, at $1 each for the paper edition (folded), $1.50 for the linen edition, mailed postpaid in a tube. The Index, listing more than 8,000 names appearing on the map, as well as many hundred Anglicized equivalents (familiar place-name forms), is available separately at 50 cents the copy.


ICELAND
Reykjavik
LANG JÖKULL
HOFS JÖKULL
VATNA JÖKULL
ODADAHRAUN
Grimsey
Rifstangi
Thistil Fjördur
Langanes
Vopna Fjördur
Breidi Fjördur
Faxa Fjördur
Snaefells Jökull
Reykjanes
Vestmannaeyjar
C.Portland
Horna Fjördur
Hvalnes
C.Horn (North C.)
Straumnes
Hunaflói
Eyja Fj.
Skjálfandi
Arctic Circle
N O R W E G
S E A
A R
N
A
E
C
FAERÖERNE
(THE FAEROES)
(Denmark)
NORDERÖER
STRÖMÖ
VAAGÖ
ÖSTERÖ
SANDÖ
SYDERÖ
Rockall
SHETLAND ISLANDS
Mainland
Yell
Unst
Foula
Sumburgh Hd.
Fair I.
N. Rona
Sule Skerry
Stack Skerry
Butt of Lewis
C.Wrath
Westray
Mainland
N. Ronaldsay
Sanday
Flannan Is.
Borerây
St. Kilda
Sulisker
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56
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NAMES OF COUNTRIES

ENGLISH	NATIONAL
Albania	Shqipënië
Andorra	Andorra
Austria	Österreich
Belgium	Belgique
Bulgaria	Blgarija
Czechoslovakia	Československo
Denmark	Danmark
Egypt	Misr
Estonia	Eesti
Finland	Suomi
France	France
Germany	Deutsches Reich
Great Britain	Great Britain
Greece	Hellas
Hungary	Magyar
Iceland	Island
Iraq	Iraq
Irish Free State	Saorstát Eireann
Italy	Italia
Jugoslavia	Jugoslavija
Latvia	Latvija
Liechtenstein	Liechtenstein
Lithuania	Lietuva
Luxembourg	Luxembourg
Monaco	Monaco
Netherlands (The)	Nederland
Norway	Norge
Palestine	Palestine
Persia	Irân
Poland	Polska
Portugal	Portugal
Rumania	România
San Marino	San Marino
Spain	España
Sweden	Sverige
Switzerland	Helvetia
Transjordan	Sharqi-al'Ardan
Turkey	Türkiye
Union of Soviet Socialist Republics	Soyuz Sovetskikh Sotsialisticheskikh Respublik
Vatican City (Papal State within Rome)	Città Vaticano

GEOGRAPHICAL EQUIVALENTS

SEA: Hav, Mare, More.

BAY, GULF and FJORD: Bugt, Firth, Fj., Fjord, Fjördur, G., Golfe, Golfo, Guba, Kólp., Kólpos, Körf., Körfez, Liman, Vig, Zal., Zaliv.

STRAIT: Belt, Proliv, St., Stretto, Sund.

LAKE: Ezero, G., Gölü, Järvi, Jaure, Javr, Jezero, Lac, Lago, Loch, Lough, Oz., Ozero, Sebkha, See, Sjö, Träsk, V., Vand, Vesi, Zee.

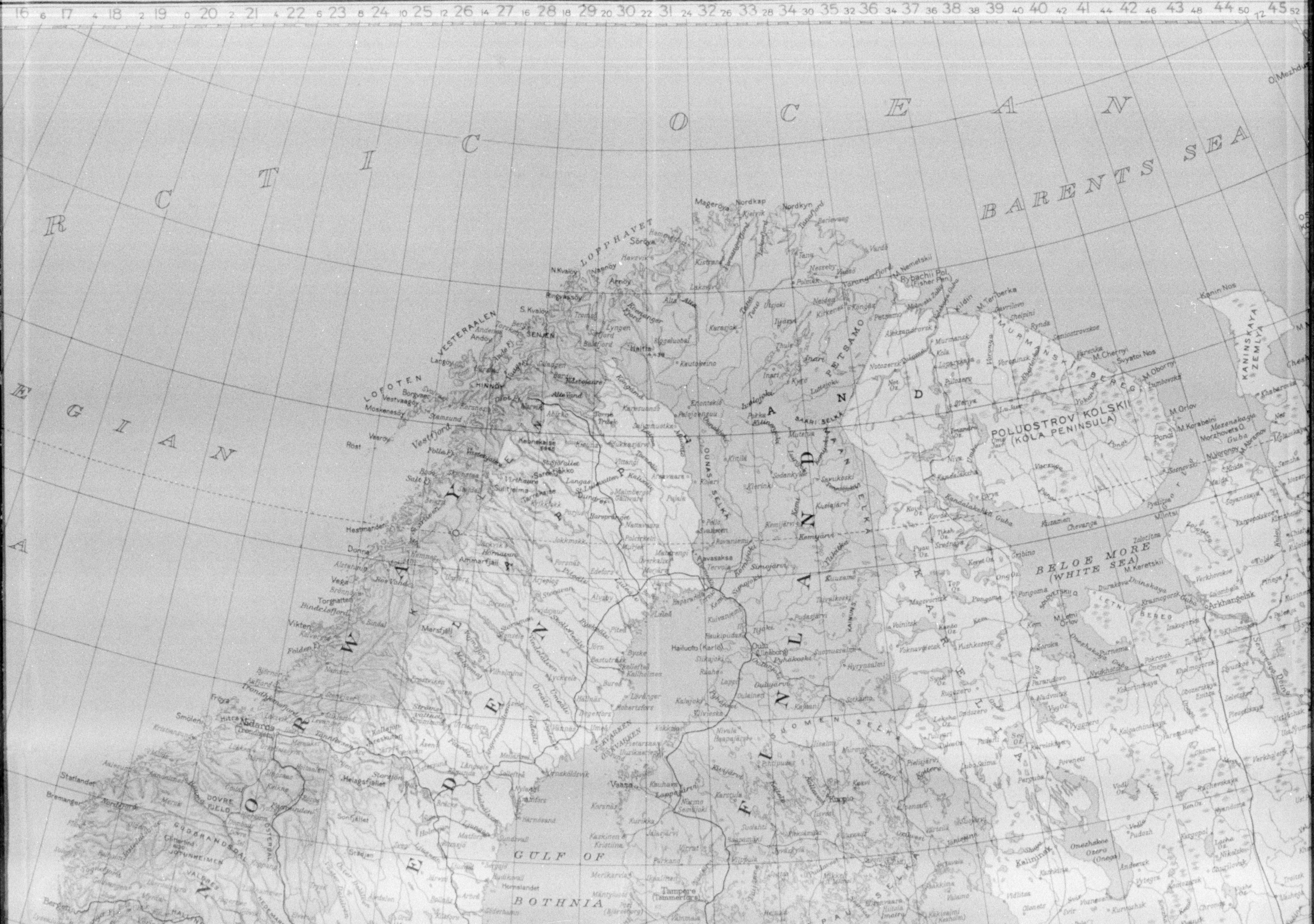
RIVER: Á, Å, Ab, Älv, Irmak, Joki, Nehri, Rud, Shatt, Su, Suyu, Wadi, Yaga.

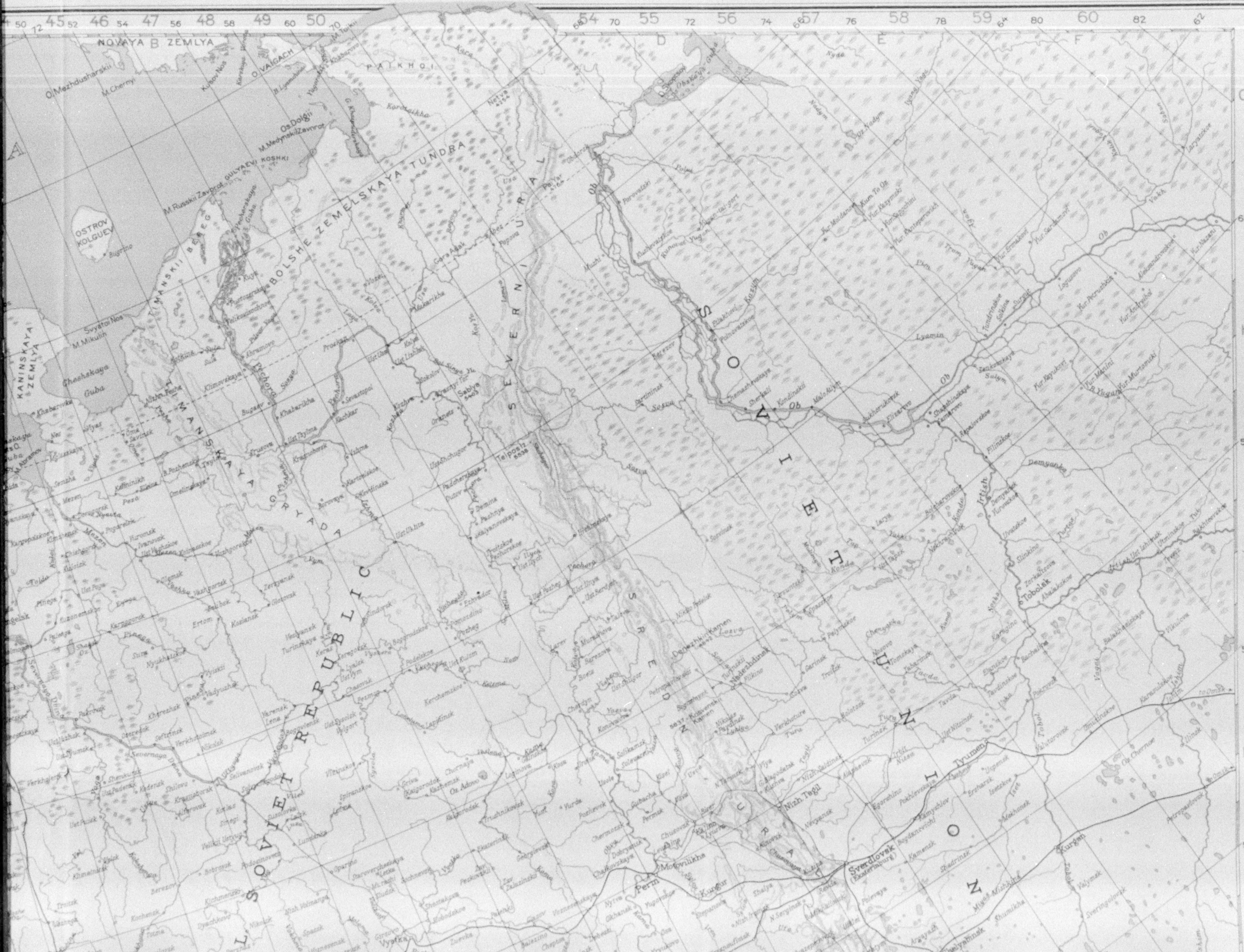
GLACIER: Brae, Fonn, Jökel, Jökull.

ISLAND: Ey, Île, Isola, O., Ostrov, Ö, Öy.

CAPE: Ak., Akroterion, B., Burun, C., Cabo, Kosa, M., Mys, N., Nes, Nos, P., Punta, Ras

MOUNTAIN: Ben, D., Dağı, Djebel, Fjäll, Fjeld, Geb


16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45
ARCTIC OCEAN
BARENTS SEA
NORWEGIAN SEA
LOPPHAVET
Magerøya
Nordkap
Nordkyn
Sörøya
N.Kvaløy
Ringvassøy
S.Kvaløy
Arnøy
Hammerfest
Tanafjord
Varangerfjord
Vardø
Rybachii Pol. (Fisher Pen.)
M.Nemetskii
PETSAMO
Petsamo
Kirkenes
VESTERAALEN
Andenes
Andøy
SENJEN
Tromsø
Lyngen
LOFOTEN
Vestvaagøy
Moskenesøy
Værøy
Røst
HINNØY
Narvik
Vestfjord
Lodingen
Kebnekaise
Karesuando
Haparanda
Torne Träsk
Kautokeino
Karasjok
Inari
Enontekiö
Pallastunturi
Sodankylä
Kemijärvi
Rovaniemi
Tornio
Kemi
Oulu
Hailuoto (Karlo)
Raahe
Kajaani
SUOMEN SELKÄ
OUNAS SELKÄ
SAARI SELKÄ
MAANSELKÄ
Kuusamo
Vaasa
Lapua
Kuopio
Kaskinen
Kristiina
Tampere (Tammerfors)
GULF OF BOTHNIA
VAARKEN
Umeå
Luleå
Piteå
Skellefteå
Boden
Gällivare
Jokkmokk
Arvidsjaur
Lycksele
Östersund
Storsjön
Sundsvall
Hudiksvall
Härnösand
Örnsköldsvik
Sulitjelma
Bodø
Saltfjellet
Mo
Mosjøen
Hestmanden
Dønna
Vega
Torghatten
Vikten
Trondhjemsfjord
Nidaros (Trondhjem)
Frøya
Hitra
Smølen
Kristiansund
Stadlandet
Bremanger
DOVRE FJELD
GUDBRANDSDAL
JOTUNHEIMEN
Sognefjord
VALDRES
Bergen
NORWAY
SWEDEN
FINLAND
KARELIA
POLUOSTROV KOLSKII (KOLA PENINSULA)
MURMANSKII BEREG
Murmansk
Kola
Aleksandrovsk
M.Teriberka
Gavrilovo
Rynda
Semiostrovskoe
M.Chernyi
Svyatoi Nos
M.Orlov
Ponoi
Lovozero
Imandra
Kandalaksha
Kandalakshskaya Guba
Umba
Kem
Soroka
Onega
Onezhskaya Guba
LETNI BEREG
Arkhangelsk
Dvinskaya Guba
BELOE MORE (WHITE SEA)
Mezenskaya Guba
Morzhovets O.
M.Voronov
Kanin Nos
KANINSKAYA ZEMLYA
O.Mezhdu
Severnaya Dvina
Onezhskoe Ozero (Onega)
Kargopol
Lacha Oz.
Pudozh
Kalinin
Segozero
Vygozero
Top Oz.
Kovd Oz.
Pyaozero
Kuito
Vodlozero
Lake Ladoga
Imatra
Valaamo


NOVAYA ZEMLYA
O. VAIGACH
PAIKHOI
OSTROV KOLGUEV
KANINSKAYA ZEMLYA
Cheshskaya Guba
BOLSHE ZEMELSKAYA TUNDRA
TIMANSKAYA GRYADA
SEVERNI URAL
SREDNI URAL
SOVIET UNION
SOVIET REPUBLIC
Pechora
Ob
Irtish
Tobolsk
Tyumen
Sverdlovsk (Ekaterinburg)
Nizh. Tagil
Perm
Motovilikha
Kungur
Kurgan
Sablya 5403
Telpos-iz 5538
Denezhkin Kamen
Vyatka
Kama
Vychegda
Mezen
Konda
Tavda
Tura
Tobol
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GEOGRAPHICAL EQUIVALENTS

SEA: Hav, Mare, More.

BAY, GULF and FJORD: Bugt, Firth, Fj., Fjord, Fjördur, G., Golfe, Golfo, Guba, Kólp., Kólpos, Körf., Körfez, Liman, Vig, Zal., Zaliv.

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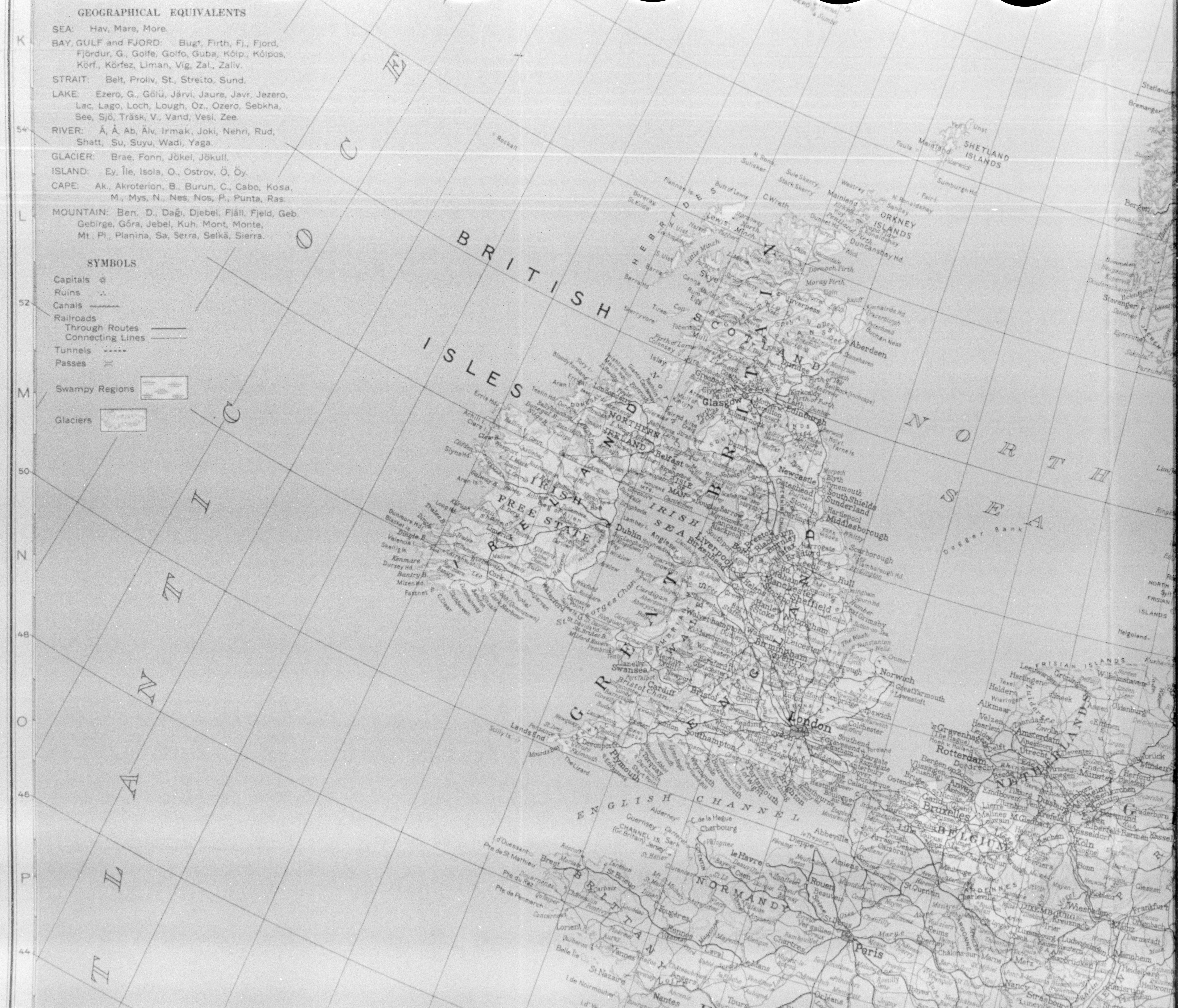
ISLAND: Ey, Île, Isola, O., Ostrov, Ö, Öy.

CAPE: Ak., Akroterion, B., Burun, C., Cabo, Kosa, M., Mys, N., Nes, Nos, P., Punta, Ras.

MOUNTAIN: Ben, D., Dağı, Djebel, Fjäll, Fjeld, Geb. Gebirge, Góra, Jebel, Kuh, Mont, Monte, Mt., Pl., Planina, Sa, Serra, Selkä, Sierra.

SYMBOLS


Capitals
Ruins
Canals
Railroads
Through Routes
Connecting Lines
Tunnels
Passes
Swampy Regions
Glaciers
K
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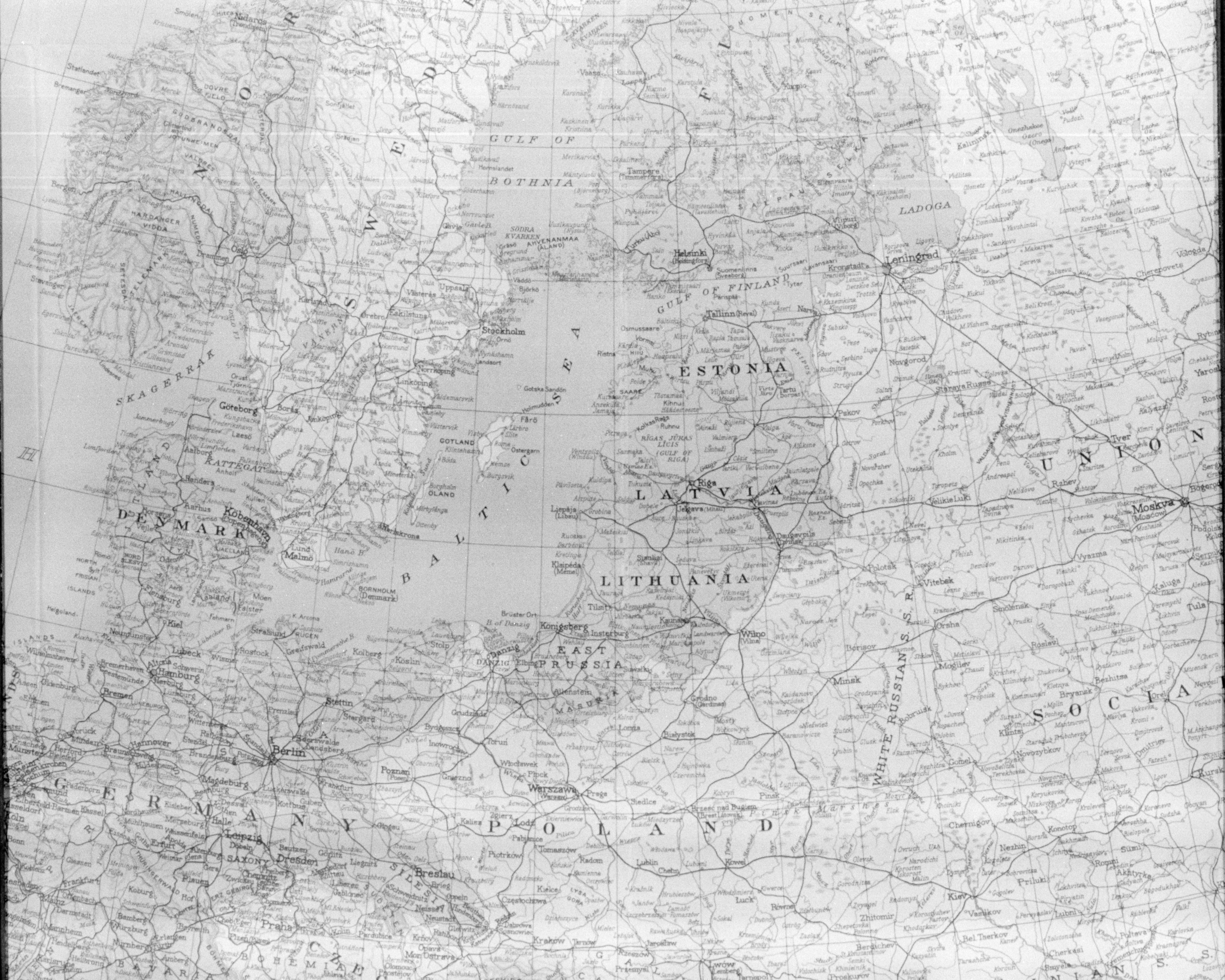
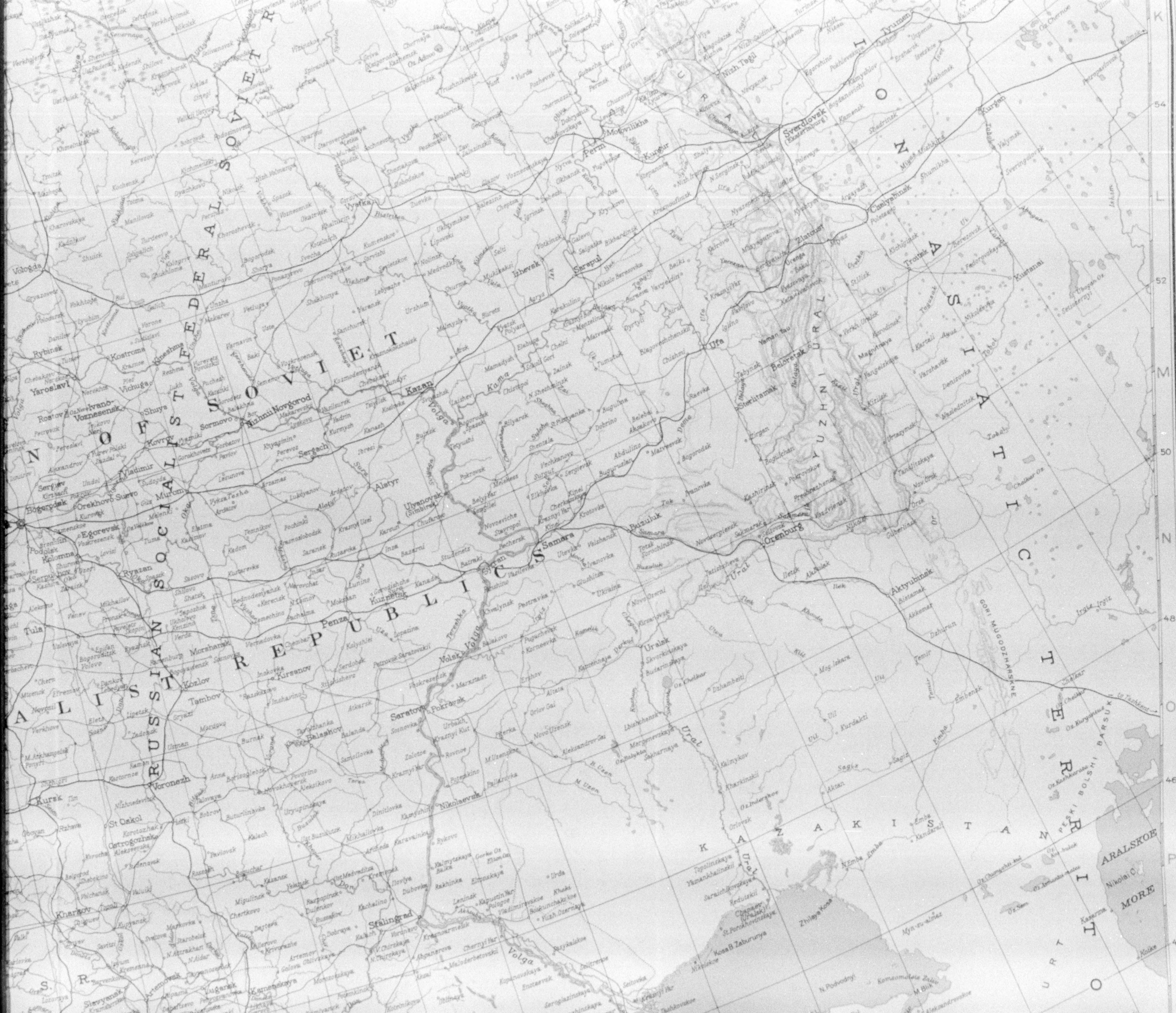
A T L A N T I C O C E
BRITISH ISLES
NORTH SEA
IRISH SEA
ENGLISH CHANNEL
SHETLAND ISLANDS
ORKNEY ISLANDS
HEBRIDES
SCOTLAND
GREAT BRITAIN
ENGLAND
WALES
IRELAND
NORTHERN IRELAND
IRISH FREE STATE
ISLE OF MAN
NORTH FRISIAN ISLANDS
FRISIAN ISLANDS
NETHERLANDS
BELGIUM
NORMANDY
BRITTANY
CHANNEL IS. (Gr. Britain)
Dogger Bank
St. Georges Chan.
Bristol Chan.
Rockall
Aberdeen
Dundee
Glasgow
Edinburgh
Belfast
Newcastle
Sunderland
South Shields
Middlesborough
Dublin
Liverpool
Manchester
Sheffield
Leeds
Hull
Birmingham
Leicester
Norwich
Cardiff
Swansea
Bristol
Southampton
Plymouth
London
Amsterdam
Rotterdam
's Gravenhage (The Hague)
Bruxelles
Lille
Cherbourg
le Havre
Rouen
Paris
Brest
Rennes
Nantes
Köln
Düsseldorf
Helgoland
Bergen
Stavanger



NORWAY
SWEDEN
FINLAND
GULF OF BOTHNIA
BALTIC SEA
GULF OF FINLAND
SKAGERRAK
KATTEGAT
LADOGA
ESTONIA
LATVIA
LITHUANIA
DENMARK
EAST PRUSSIA
MASURIA
GERMANY
POLAND
WHITE RUSSIAN S.S.R.
UNION
SOCIAL
SAXONY
SILESIA
BOHEMIA
CZECHO
GOTLAND
ÖLAND
BORNHOLM (Denmark)
RĪGAS JŪRAS LĪCIS (GULF OF RIGA)
SAARE
Pripet Marshes
Bergen
Oslo
Stavanger
Kristiansand
Göteborg
Stockholm
Uppsala
Västerås
Örebro
Linköping
Jönköping
Karlstad
Gävle
Kalmar
Karlskrona
Malmö
Lund
Helsingborg
København (Copenhagen)
Aalborg
Randers
Aarhus
Odense
Helsinki (Helsingfors)
Turku (Åbo)
Tampere (Tammerfors)
Vaasa
Viipuri (Viborg)
Leningrad
Kronstadt
Tallinn (Reval)
Narva
Tartu (Dorpat)
Pskov
Novgorod
Staraya Russa
Riga
Jelgava (Mitau)
Liepāja (Libau)
Ventspils (Windau)
Daugavpils
Klaipėda (Memel)
Šiauliai (Shavli)
Kaunas
Wilno (Vilna)
Tilsit
Königsberg
Insterburg
Allenstein
Danzig
Elbing
Gdynia
Stolp
Köslin
Kolberg
Stettin
Stralsund
Rostock
Lübeck
Kiel
Flensburg
Hamburg
Bremen
Bremerhaven
Hannover
Braunschweig
Magdeburg
Berlin
Frankfurt
Leipzig
Dresden
Halle
Erfurt
Chemnitz
Praha
Breslau
Poznań (Posen)
Bydgoszcz
Toruń
Grudziądz
Warszawa (Warsaw)
Łódź
Radom
Lublin
Kraków
Częstochowa
Białystok
Grodno
Brześć nad Bugiem (Brest Litowsk)
Pińsk
Kowel
Równe
Lwów (Lemberg)
Minsk
Bobruisk
Vitebsk
Polotsk
Orsha
Mogilev
Gomel
Smolensk
Vyazma
Rzhev
Velikie Luki
Tver
Moskva (Moscow)
Kaluga
Tula
Orel
Bryansk
Kursk
Chernigov
Kiev
Zhitomir
Berdichev
Bel Tserkov
Konotop
Vologda
Cherepovets
Rybinsk
Tikhvin
Onezhskoe Ozero (Onega)
Kirov


N OF SOVIET
SOCIALIST
REPUBLICS
RUSSIAN SOCIALIST FEDERAL SOVIET R
ALIS
S. R.
ON
ASIATIC
TERRITO
RY
KAZAKISTAN
URAL
YUZHNI URAL
GORI MUGODZHARSKIE
PESKI BOLSHI BARSUK
ARALSKOE MORE
Nikolai O.
Vologda
Rybinsk
Yaroslavl
Kostroma
Kineshma
Ivanovo-Voznesensk
Shuya
Vichuga
Rostov
Kovrov
Vladimir
Murom
Orekhovo-Suevo
Bogorodsk
Egorevsk
Kolomna
Podolsk
Serpukhov
Ryazan
Tula
Kaluga
Kozlov
Morshansk
Tambov
Voronezh
Kursk
St Oskol
Ostrogozhsk
Kharkov
Nizhnii Novgorod
Sormovo
Sergach
Kazan
Vyatka
Perm
Motovilikha
Kungur
Izhevsk
Sarapul
Ufa
Beloretsk
Sterlitamak
Zlatoust
Chelyabinsk
Sverdlovsk (Ekaterinburg)
Nizh. Tagil
Tyumen
Kurgan
Troitsk
Kustanai
Orenburg
Orsk
Aktyubinsk
Chalkar
to Tashkent
Buzuluk
Samara
Syzran
Ulyanovsk (Simbirsk)
Alatyr
Penza
Kuznetsk
Volsk
Saratov
Pokrovsk
Balashov
Kirsanov
Kamyshin
Stalingrad
Nikolaevsk
Uralsk
Chapaev (Uralsk)
Volga
Kama
Oka
Ural
Don
Emba
Ilek
Tobol
K
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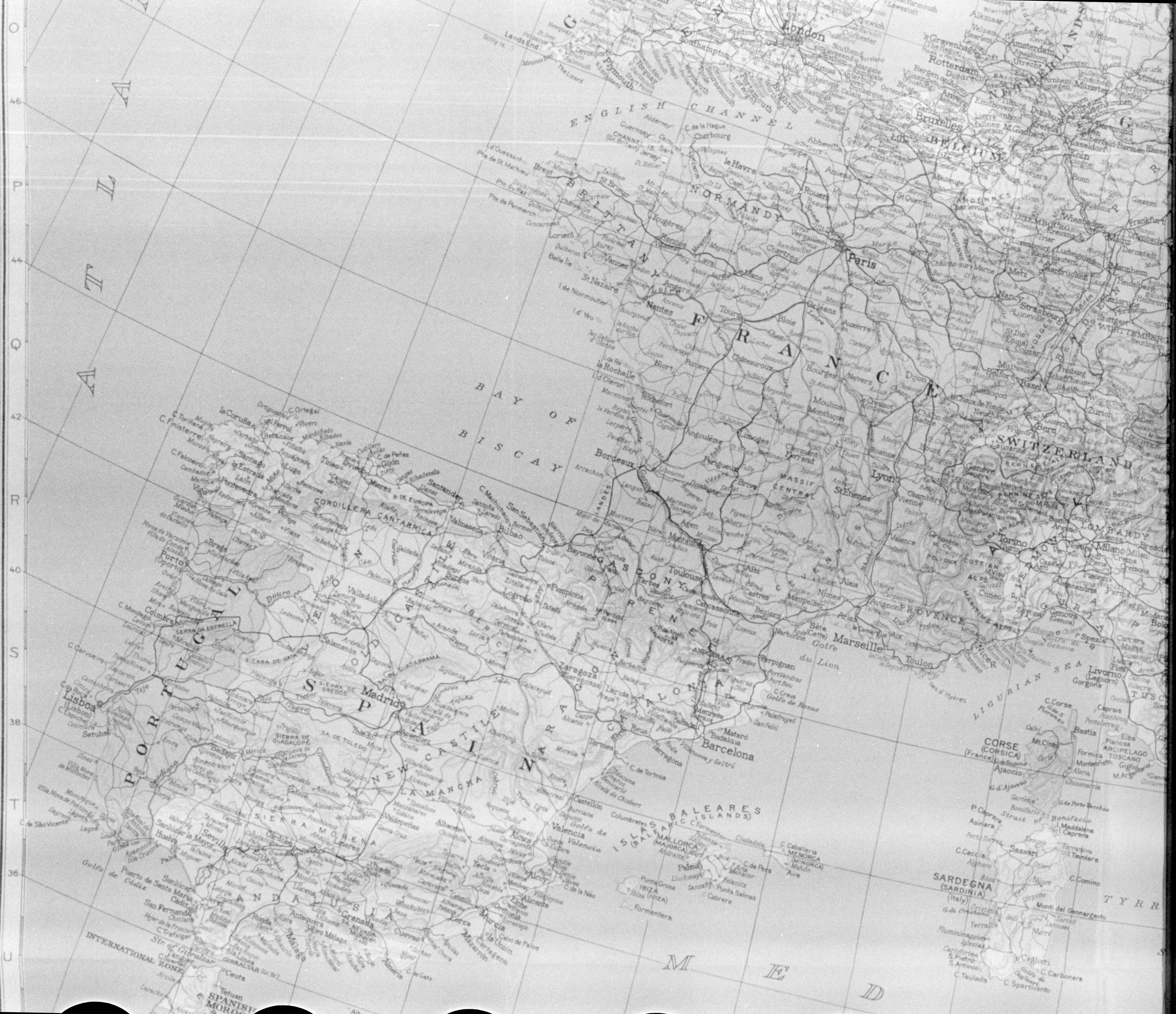
O
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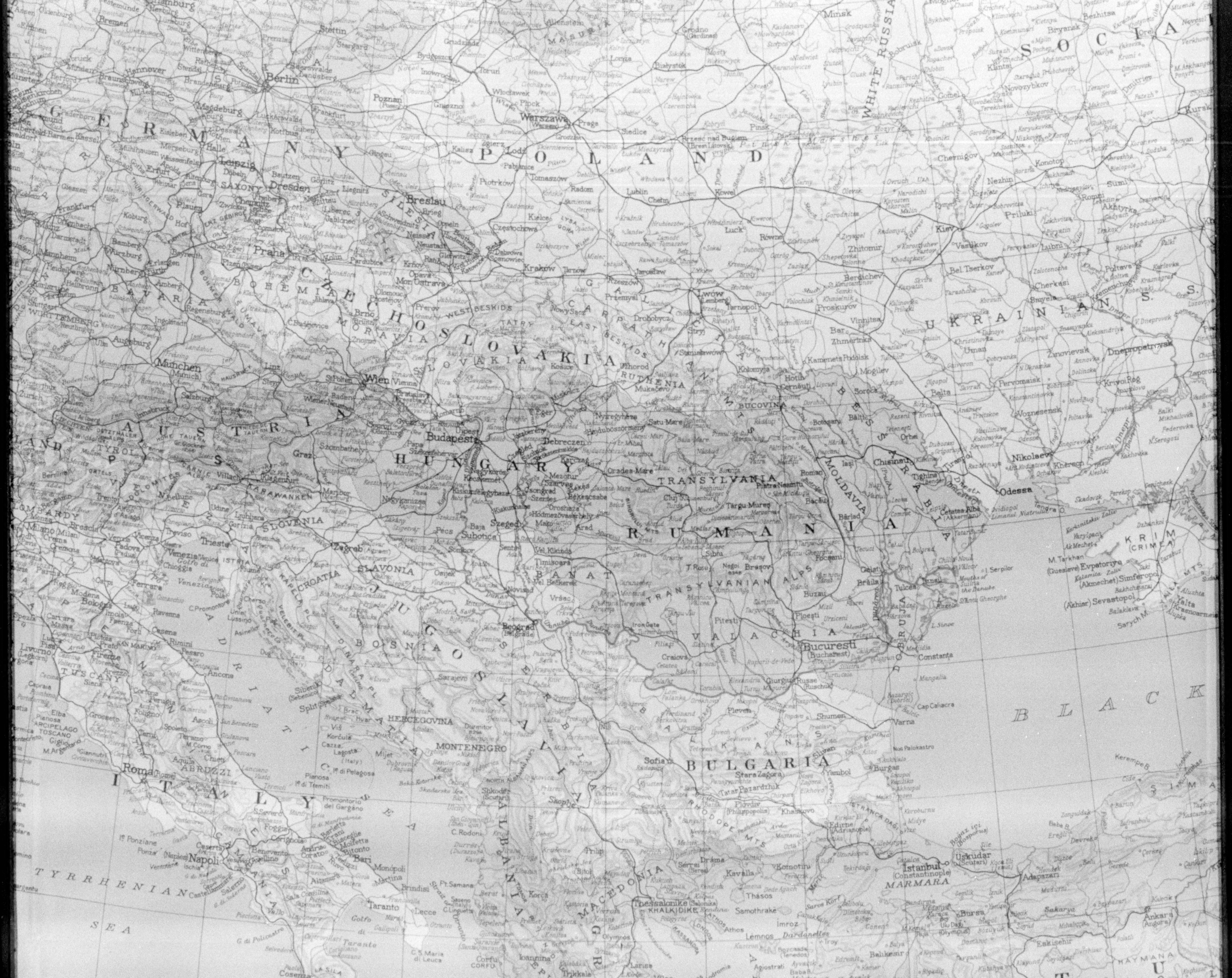
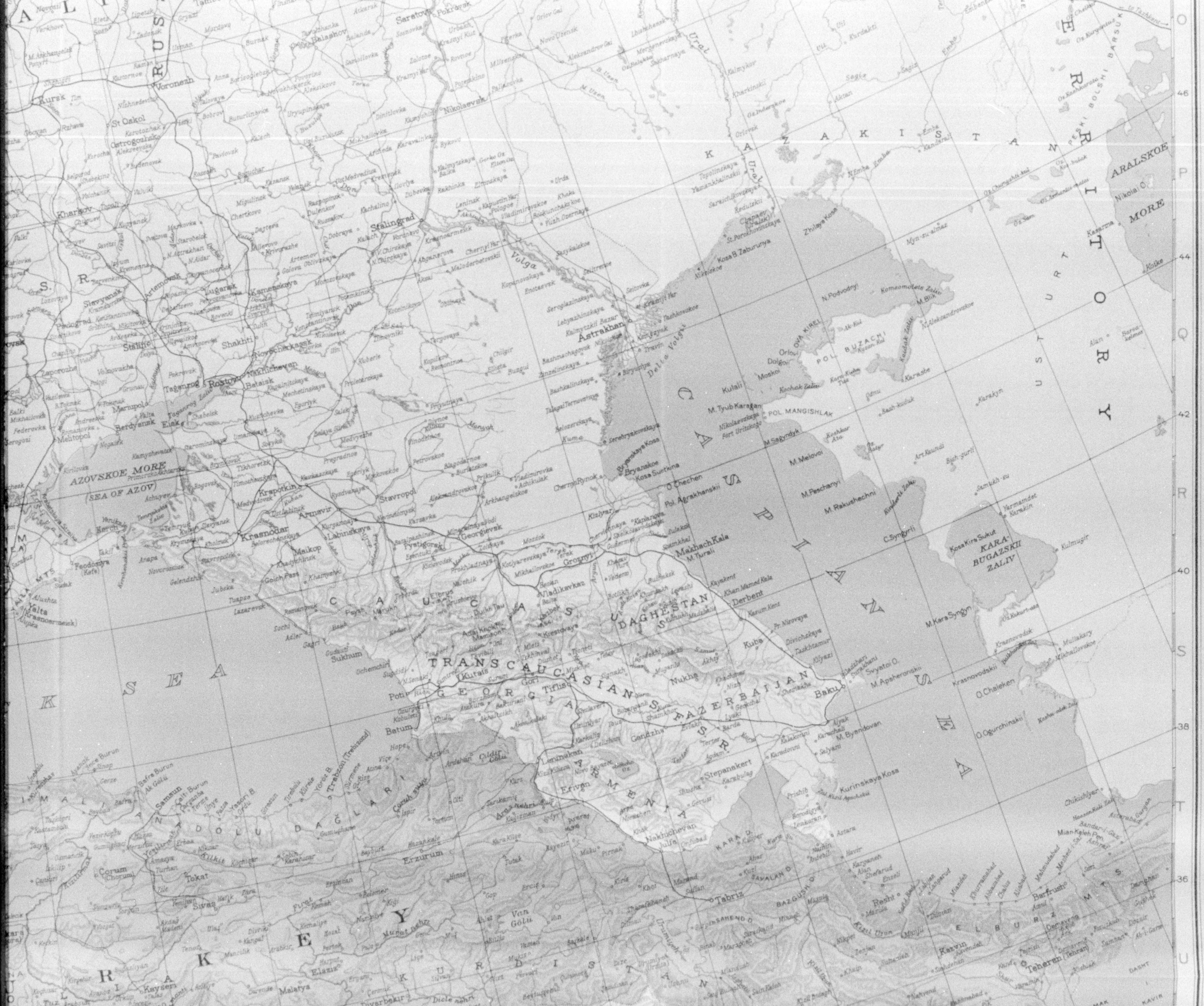
A T L A
ENGLISH CHANNEL
London
Plymouth
Southampton
Brighton
Lands End
NETHERLANDS
Amsterdam
Rotterdam
BELGIUM
Bruxelles
Lille
Dieppe
le Havre
Cherbourg
Brest
BRITTANY
NORMANDY
Rouen
Amiens
Paris
Versailles
Chartres
Rennes
le Mans
Nantes
St Nazaire
Tours
Orléans
Blois
F R A N C E
Reims
Metz
Nancy
Strasbourg
Mulhouse
Dijon
Bourges
Nevers
Limoges
Poitiers
la Rochelle
Angoulême
BAY OF BISCAY
Bordeaux
Clermont Ferrand
MASSIF CENTRAL
Lyon
St Etienne
Genève
SWITZERLAND
Zurich
Bern
Basel
Agen
Montauban
Toulouse
Carcassonne
Narbonne
Montpellier
Nimes
Avignon
Marseille
Toulon
Nice
PROVENCE
GASCONY
Bayonne
Pau
P Y R E N E E S
ANDORRA
Perpignan
Golfe du Lion
LIGURIAN SEA
Genova
Torino
Milano
LOMBARDY
Livorno
CORSE (CORSICA) (France)
Ajaccio
Bastia
Strait of Bonifacio
SARDEGNA (SARDINIA) (Italy)
Sassari
Cagliari
TYRR
la Coruña
Santiago
Lugo
Oviedo
Gijón
Santander
Bilbao
San Sebastian
Vitoria
Pamplona
Logroño
Burgos
CORDILLERA CANTABRICA
Vigo
Braga
Porto (Oporto)
Coimbra
SERRA DA ESTRELLA
P O R T U G A L
Lisboa (Lisbon)
Setubal
Valladolid
Salamanca
Zaragoza
Lérida
Tarragona
Barcelona
CATALONIA
A R A G O N
Madrid
Toledo
S P A I N
NEW CASTILE
LA MANCHA
Valencia
Castellón
Alicante
Murcia
Cartagena
Badajoz
SIERRA MORENA
Sevilla
Córdoba
Jaén
Granada
Málaga
Cádiz
A N D A L U S I A
Huelva
Almería
ISLAS BALEARES (BALEARIC ISLANDS)
MALLORCA (MAJORCA)
Palma
MENORCA (MINORCA)
IBIZA (IVIZA)
Formentera
Str. of Gibraltar
GIBRALTAR (Gr. Br.)
INTERNATIONAL ZONE
Tanger
Ceuta
Tetuan
SPANISH MOROCCO
M E D


GERMANY
POLAND
WHITE RUSSIA
SOCIA
UKRAINIAN S. S.
CZECHOSLOVAKIA
SLOVAKIA
BOHEMIA
MORAVIA
SILESIA
SAXONY
BAVARIA
WÜRTTEMBERG
AUSTRIA
TYROL
HUNGARY
RUMANIA
TRANSYLVANIA
TRANSYLVANIAN ALPS
MOLDAVIA
BESSARABIA
BUCOVINA
RUTHENIA
GALICIA
CARPATHIAN MTS
WEST BESKIDS
EAST BESKIDS
TATRY
BANAT
VALACHIA
DOBRUJA
JUGOSLAVIA
SLOVENIA
CROATIA
SLAVONIA
BOSNIA
HERCEGOVINA
DALMATIA
MONTENEGRO
SERBIA
ALBANIA
MACEDONIA
BULGARIA
BALKANS
RHODOPE MTS
KHALKIDIKE
ITALY
LOMBARDY
TUSCANY
ABRUZZI
ADRIATIC SEA
TYRRHENIAN SEA
BLACK
MARMARA
KRIM (CRIMEA)
ISTRIA
KARAWANKEN
DOLOMITES
Pinsk Marshes
MASURIA
Berlin
Hamburg
Bremen
Hannover
Stettin
Leipzig
Dresden
Breslau
München (Munich)
Nürnberg
Frankfurt
Praha
Brno
Wien (Vienna)
Budapest
Warszawa
Kraków
Lwów (Lemberg)
Minsk
Kiev
Odessa
Nikolaev
Dnepropetrovsk
Kharkov
Zhitomir
Berdichev
Vinnitsa
Chisinau
Iasi
Cluj (Klausenburg)
Oradea-Mare
Timisoara
Brasov
Sibiu
Ploesti
Bucuresti (Bucharest)
Constanta
Galati
Braila
Varna
Burgas
Sofia
Plovdiv (Philippopolis)
Edirne (Adrianople)
Istanbul (Constantinople)
Üsküdar (Scutari)
Bursa
Ankara (Angora)
Thessalonike (Salonika)
Beograd (Belgrade)
Zagreb (Agram)
Sarajevo
Split (Spalato)
Skopje
Trieste
Venezia
Milano (Milan)
Bologna
Firenze
Livorno (Leghorn)
Roma
Napoli
Bari
Brindisi
Taranto
Ancona
Szeged
Debreczen
Pécs
Graz
Salzburg
Innsbruck
Linz
Sevastopol
Simferopol
Yalta
Evpatoriya


KAZAKISTAN
TERRITORY
ARALSKOE MORE
CASPIAN SEA
KARA-BUGAZSKII ZALIV
USTYURT
POL. BUZACHI
POL. MANGISHLAK
AZOVSKOE MORE
(SEA OF AZOV)
CAUCASUS
DAGHESTAN
TRANSCAUCASIAN S.F.S.R.
GEORGIA
AZERBAIJAN
ARMENIA
KURDISTAN
TURKEY
ELBURZ MTS
Saratov
Pokrovsk
Kursk
Voronezh
St Oskol
Ostrogozhsk
Kharkov
Artemovsk
Lugansk
Stalino
Shakhti
Novocherkassk
Rostov
Nakhichevan
Taganrog
Mariupol
Berdyansk
Melitopol
Kerch
Feodosiya
Yalta
Krasnodar
Kropotkin
Armavir
Stavropol
Pyatigorsk
Georgievsk
Maikop
Vladikavkaz
Grozny
Makhach Kala
Derbent
Stalingrad
Nikolaevsk
Astrakhan
Delta Volgi
Volga
Don
Ural
Emba
Sukhum
Poti
Kutais
Batum
Tiflis
Gori
Nukha
Baku
Gandzha
Leninakan
Erivan
Stepanakert
Nakhichevan
Julfa
Tabriz
Resht
Kazvin
Teheren (Tehran)
Barfrush
Trabzon (Trebizond)
Samsun
Erzurum
Sivas
Tokat
Amasya
Corum (Chorum)
Kayseri
Malatya
Elazig
Diyarbekir
Van Gölü
Krasnovodsk
M. Apsheronskii
O. Chechen
Kulali
Moskoi
Kosa Kira Sukut
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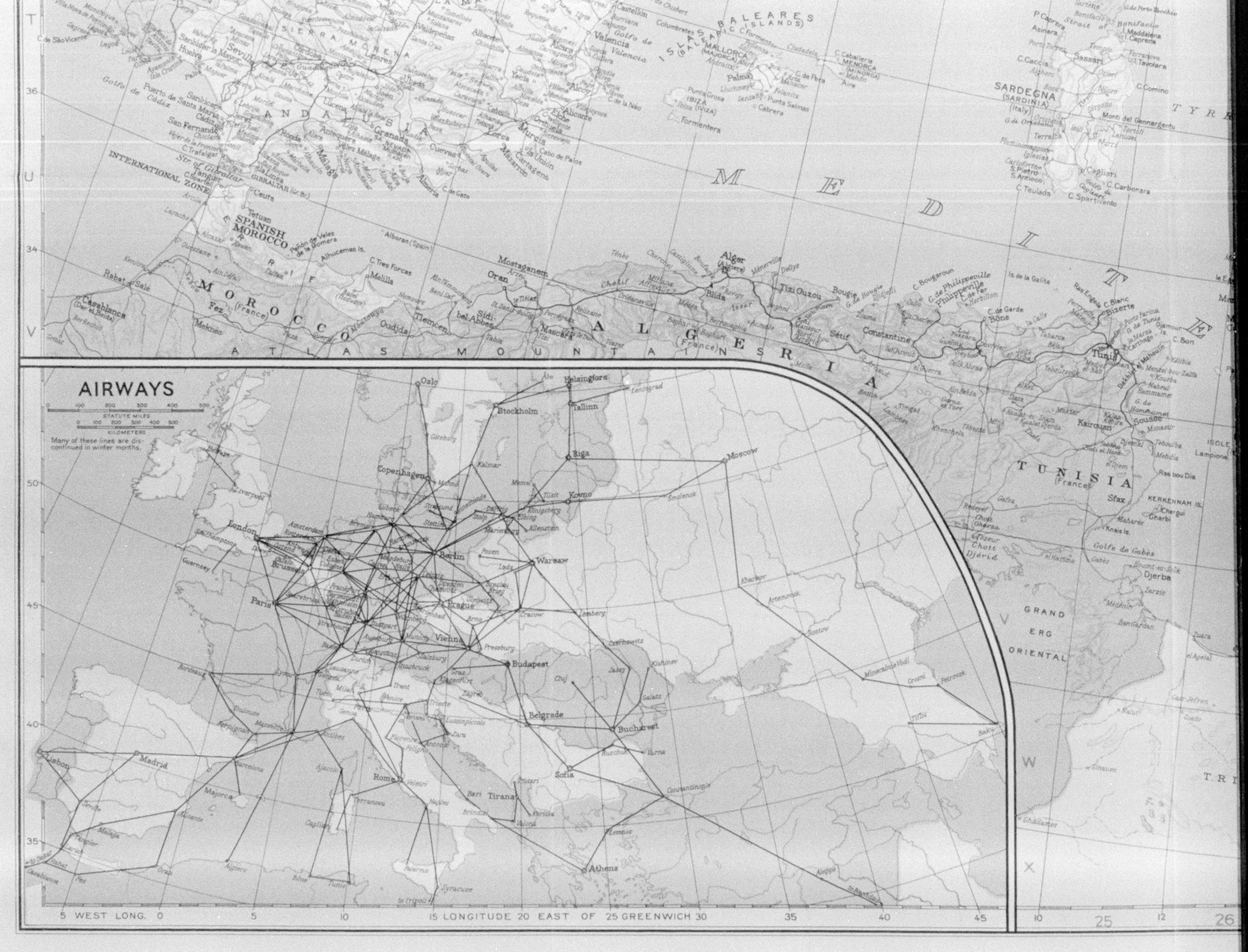
AIRWAYS
STATUTE MILES
KILOMETERS
0 100 200 300 400 500
London
Paris
Brussels
Amsterdam
Rotterdam
Southampton
Guernsey
Belfast
Liverpool
Bordeaux
Marseilles
Perpignan
Antibes
Geneva
Lausanne
Zurich
Basel
Strasbourg
Frankfort
Cologne
Hamburg
Bremen
Lübeck
Stettin
Berlin
Dresden
Leipzig
Magdeburg
Halle
Munich
Stuttgart
Nuremberg
Augsburg
Innsbruck
Salzburg
Vienna
Pressburg
Budapest
Prague
Brno
Breslau
Gleiwitz
Cracow
Lodz
Posen
Warsaw
Danzig
Stolp
Elbing
Königsberg
Marienburg
Allenstein
Tilsit
Memel
Kovno
Riga
Tallinn
Helsingfors
Åbo
Leningrad
Stockholm
Oslo
Göteborg
Kalmar
Copenhagen
Malmö
Stralsund
Swinemünde
Smolensk
Moscow
Kharkov
Artemovsk
Rostov
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Grozni
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Tiflis
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Lemberg
Czernowitz
Kishinev
Jassy
Galatz
Cluj
Bucharest
Varna
Ruschuk
Sofia
Constantinople
Belgrade
Zagreb
Graz
Klagenfurt
Trieste
Brioni
Lussinpiccolo
Zara
Ancona
Venice
Trent
Milan
Turin
Genoa
Pisa
Florence
Foligno
Rome
Velletri
Naples
Bari
Brindisi
Tirana
Scutari
Valona
Parilia
Lemnos
Athens
Aleppo
to Bagdad
Palermo
Syracuse
to Tripoli
Cagliari
Terranova
Ajaccio
Tunis
Bône
Algiers
Oran
Fez
Rabat
Casablanca
to Dakar
Larache
Tangier
Malaga
Seville
Madrid
Lisbon
Barcelona
Majorca
Alicante
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Córdoba
Granada
Málaga
Almería
Cádiz
San Fernando
Huelva
Jerez
C. Trafalgar
Str. of Gibraltar
GIBRALTAR (Gr. Br.)
Tangier
INTERNATIONAL ZONE
Ceuta
Tetuan
SPANISH MOROCCO
Melilla
C. Tres Forcas
Alhucemas Is.
Peñón de Velez de la Gomera
Alboran (Spain)
MOROCCO (France)
Casablanca (Dar el Beida)
Rabat
Salé
Fez
Meknès
Larache
Oudjda
Tlemcen
Sidi bel Abbès
Oran
Mostaganem
Mascara
ALGERIA (France)
Alger (Algiers)
Blida
Ménerville
Dellys
Tizi Ouzou
Bougie
Sétif
Constantine
C. Bougaroun
G. de Philippeville
Philippeville
C. de Fer
Bône
C. de Garde
Is. de la Galite
Bizerte
C. Blanc
Ras Engela
Tunis
C. Bon
Sousse
Kairouan
Monastir
Mahdia
Sfax
KERKENNAH IS.
Gabès
Golfe de Gabès
Djerba
Zarzis
TUNISIA (France)
Chott Djérid
GRAND ERG ORIENTAL
Ghadames
ATLAS MOUNTAINS
MEDITERRANEAN
Valencia
Golfo de Valencia
Castellón
Columbretes
Alicante
Elche
Murcia
Cartagena
Lorca
Alcoy
Yecla
Albacete
Valdepeñas
Linares
Jaén
Cabo de Palos
C. de Gata
C. de la Nao
ISLAS BALEARES (BALEARIC ISLANDS)
MALLORCA (MAJORCA)
MENORCA (MINORCA)
Palma
IBIZA (IVIZA)
Formentera
Cabrera
Ciudadela
Mahón
SARDEGNA (SARDINIA) (Italy)
Sassari
Cagliari
Oristano
Alghero
Asinara
C. Caccia
Monti del Gennargentu
C. Teulada
C. Spartivento
C. Carbonara
S. Pietro
S. Antioco
Carloforte
Tavolara
I. Maddalena
Bonifacio
Strait of Bonifacio
Golfo de Cádiz
C. de São Vicente
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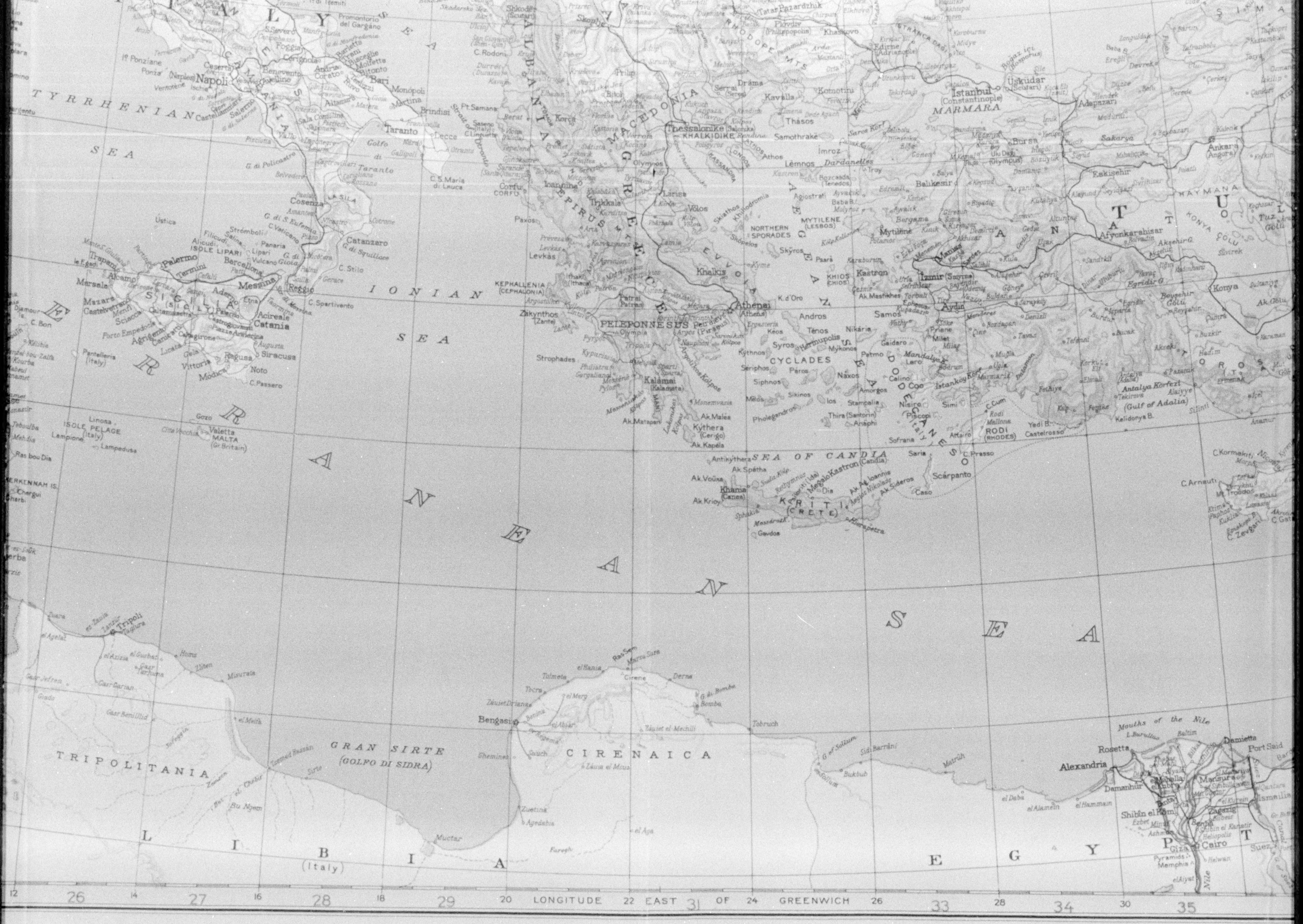
Many of these lines are discontinued in winter months.



ITALY
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IONIAN SEA
MEDITERRANEAN SEA
SEA OF CANDIA
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Salerno
Foggia
Bari
Brindisi
Taranto
Monòpoli
Golfo di Taranto
Cosenza
Catanzaro
Reggio
Messina
Palermo
Trapani
Marsala
Mazara
SICILIA
Catania
Siracusa
Ragusa
C. Passero
ISOLE LIPARI
Ustica
Pantelleria (Italy)
ISOLE PELAGIE (Italy)
Linosa
Lampione
Lampedusa
Gozo
Valetta
MALTA (Gr. Britain)
Capri
ALBANIA
MACEDONIA
GREECE
EPIRUS
PELEPONNESUS
Thessalonike (Salonika)
Athenai (Athens)
Patrai (Patras)
Corfu
Paxos
Levkas
KEPHALLENIA (CEPHALONIA)
Zakynthos (Zante)
Strophades
Kalamai
Larisa
Volos
Khalkis
EVVOIA
Skiathos
NORTHERN SPORADES
Skyros
CYCLADES
Andros
Tenos
Syros
Hermoupolis
Mykonos
Naxos
Paros
Milos
Thira (Santorin)
Kythera (Cerigo)
Antikythera
KRITI (CRETE)
Khania (Canea)
Megalo Kastron (Candia)
Gavdos
DODECANESO (Italy)
RODI (RHODES)
Scarpanto
Caso
Samos
Mytilene (Lesbos)
Khios (Chios)
Lemnos
Thasos
Samothrake
Imroz
Dardanelles
Istanbul (Constantinople)
Uskudar (Scutari)
MARMARA
Bursa
Edirne (Adrianople)
Kavalla
Drama
Serrai
Komotini
RHODOPE MTS
Izmir (Smyrna)
Aydin
Balikesir
Eskisehir
Ankara (Angora)
Afyonkarahisar
Konya
ANATOLIA
TOROS
Antalya Korfezi (Gulf of Adalia)
Kalamata
Mt. Troodos
TRIPOLITANIA
Tripoli
Homs
Misurata
GRAN SIRTE (GOLFO DI SIDRA)
Bengasi
CIRENAICA
Derna
Tobruch
Sidi Barrani
LIBIA (Italy)
EGYPT
Alexandria
Rosetta
Damietta
Port Said
Mansura
Cairo
Giza
Pyramids
Memphis
Suez
Mouths of the Nile
Nile
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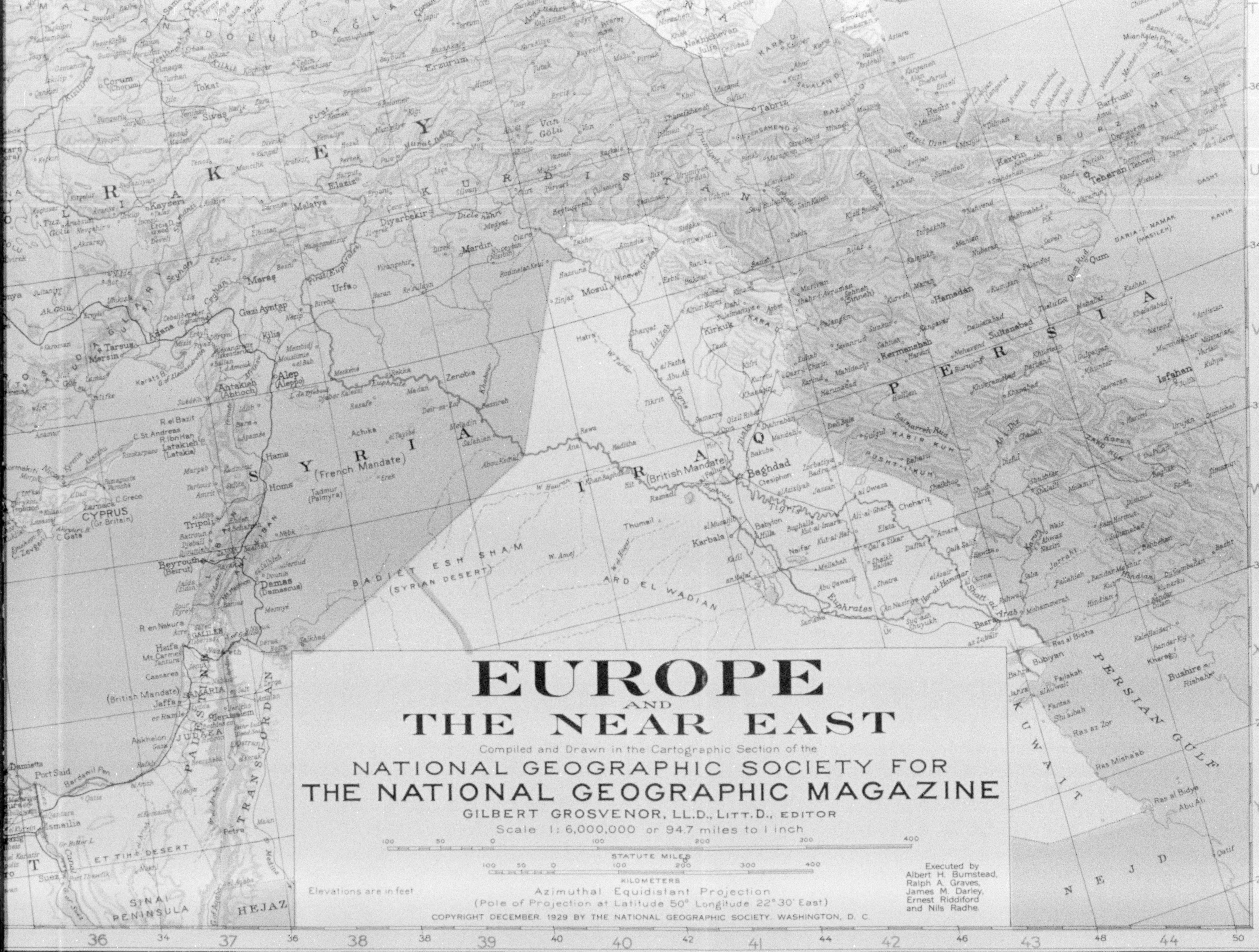
TURKEY
KURDISTAN
SYRIA
(French Mandate)
IRAQ
(British Mandate)
PERSIA
ELBURZ MTS
PALESTINE
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TRANSJORDAN
CYPRUS
(Gr. Britain)
KUWAIT
NEJD
HEJAZ
SINAI PENINSULA
ET TIH DESERT
BADIET ESH SHAM
(SYRIAN DESERT)
ARD EL WADIAN
PERSIAN GULF
Erzurum
Tabriz
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Kayseri
Malatya
Diyarbekir
Mardin
Urfa
Mosul
Kirkuk
Alep
(Aleppo)
Antakieh
(Antioch)
Adana
Tarsus
Mersin
Hama
Homs
Tripoli
Beyrouth
(Beirut)
Damas
(Damascus)
Haifa
Jaffa
Jerusalem
Port Said
Ismailia
Suez
Baghdad
Karbala
Euphrates
Tigris
Basra
Kermanshah
Hamadan
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Isfahan
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EUROPE
AND
THE NEAR EAST

Compiled and Drawn in the Cartographic Section of the
NATIONAL GEOGRAPHIC SOCIETY FOR
THE NATIONAL GEOGRAPHIC MAGAZINE
GILBERT GROSVENOR, LL.D., LITT.D., EDITOR
Scale 1: 6,000,000 or 94.7 miles to 1 inch

100 50 0 100 200 300 400
STATUTE MILES
100 50 0 100 200 300 400
KILOMETERS

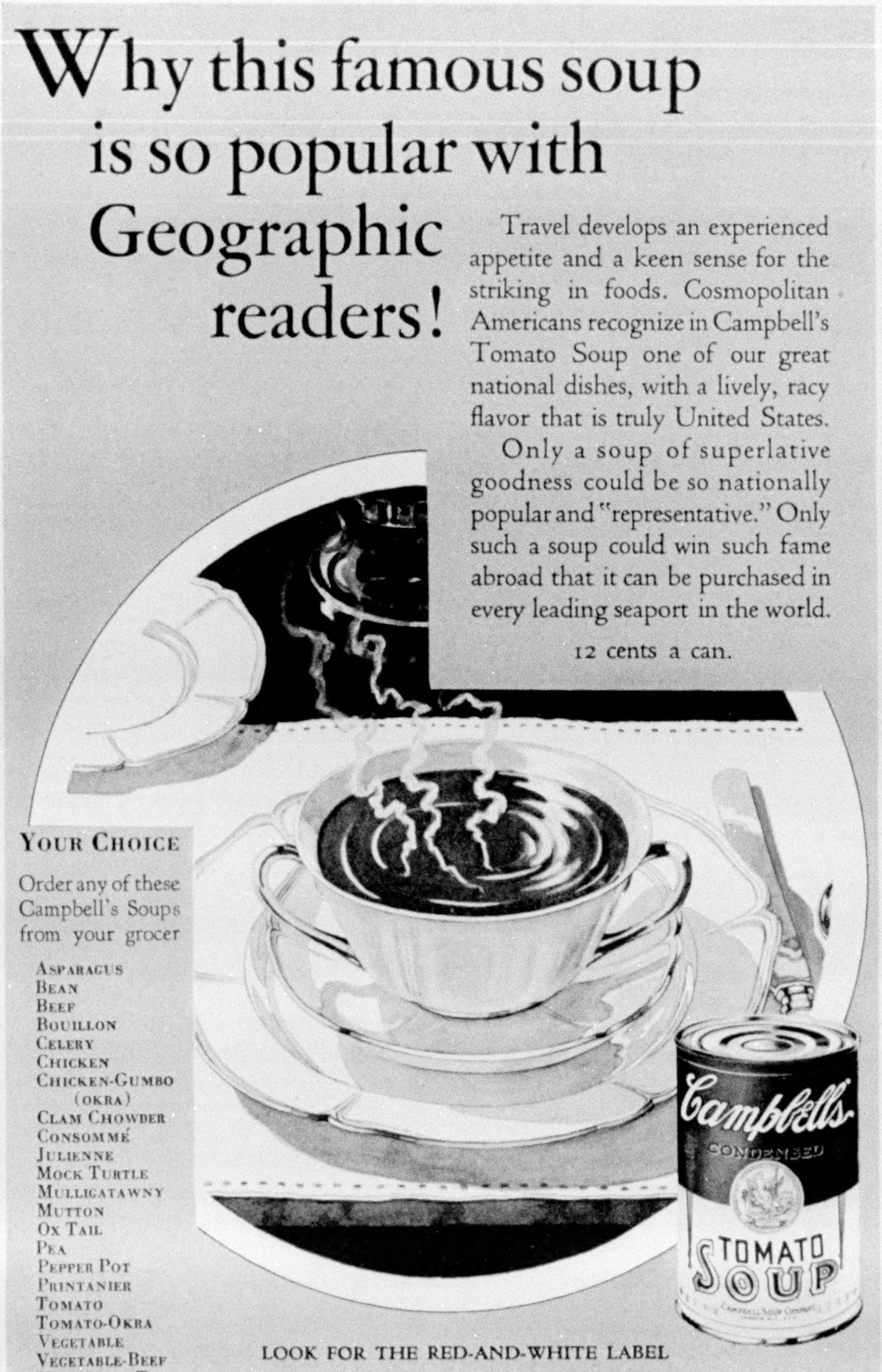
Elevations are in feet
Azimuthal Equidistant Projection
(Pole of Projection at Latitude 50° Longitude 22°30' East)

COPYRIGHT DECEMBER 1929 BY THE NATIONAL GEOGRAPHIC SOCIETY, WASHINGTON, D. C.

Executed by
Albert H. Bumstead,
Ralph A. Graves,
James M. Darley,
Ernest Riddiford
and Nils Radhe

A. HOEN & CO. BALTIMORE, U.S.A.

XUM



Why this famous soup is so popular with Geographic readers!

Travel develops an experienced appetite and a keen sense for the striking in foods. Cosmopolitan Americans recognize in Campbell's Tomato Soup one of our great national dishes, with a lively, racy flavor that is truly United States.

Only a soup of superlative goodness could be so nationally popular and "representative." Only such a soup could win such fame abroad that it can be purchased in every leading seaport in the world.

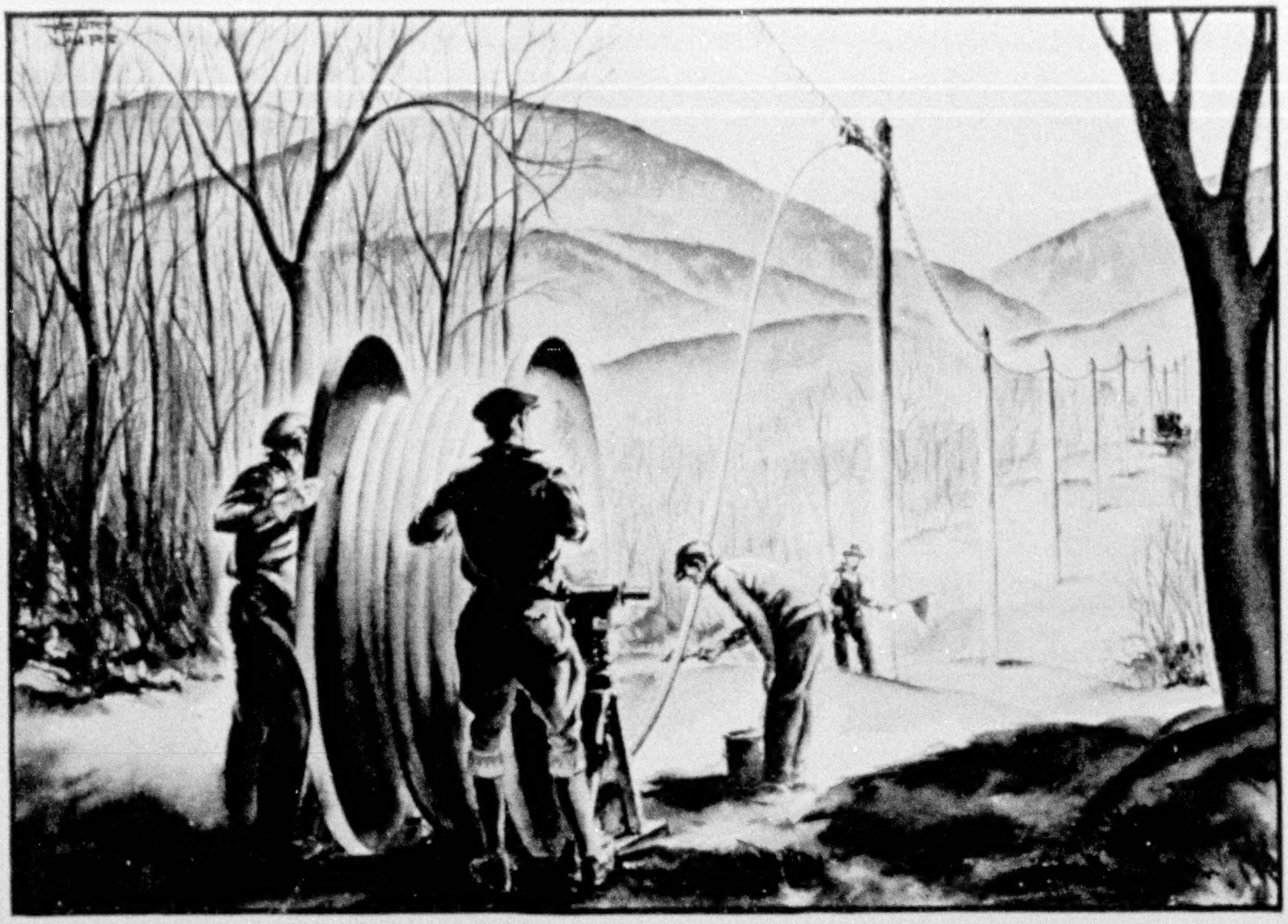
12 cents a can.

YOUR CHOICE

Order any of these Campbell's Soups from your grocer

- Asparagus
- Bean
- Beef
- Bouillon
- Celery
- Chicken
- Chicken-Gumbo (okra)
- Clam Chowder
- Consommé
- Julienne
- Mock Turtle
- Mulligatawny
- Mutton
- Ox Tail
- Pea
- Pepper Pot
- Printanier
- Tomato
- Tomato-Okra
- Vegetable
- Vegetable-Beef
- Vermicelli-Tomato

LOOK FOR THE RED-AND-WHITE LABEL



BIG AND LITTLE, RICH AND POOR, CAN PROJECT THEIR PERSONALITIES OVER THE WIDE NETWORK OF ITS WIRES

In the service of all the people

An Advertisement of the
American Telephone and Telegraph Company

AMERICAN TELEPHONE & TELEGRAPH CO.
BELL SYSTEM
AND ASSOCIATED COMPANIES

The Bell System is owned by 450,000 stockholders and operated by more than 400,000 workers for the service of the people of the nation.

It is a democratic instrument of a democracy. Big and little, rich and poor, can project their personalities over the wide network of its wires. For friendship or business, pleasure or profit, the telephone is indispensable to our modern civilization.

This year the Bell System is erecting new telephone buildings in more than 200 cities. It is putting in thousands of miles of cable, thousands of sections of switchboard and hundreds of thousands of new telephones. Its expenditure for plant and improvements in service in 1929 will be more than 550 millions of dollars—half again as much as it cost to build the Panama Canal.

This program is part of the telephone ideal that anyone, anywhere, shall be able to talk quickly and at reasonable cost with anyone, anywhere else. There is no standing still in the Bell System.

"They should inherit a dependable income"

Invest today for their tomorrow

Good securities are among the surest and the least troublesome income-producers you can possibly leave to your dependents. Their income will supplement your own personal earnings while you live. When you go, their income-producing qualities will continue unimpaired.

Let us help you build an investment program which will expand as your business and income expand. At National City offices in over fifty American cities and in important foreign centers you will find experienced bond men ready to analyze your personal investment needs and make suitable recommendations. They have contact with investment conditions throughout the world, and enjoy an institutional heritage of over 115 years of financial experience.

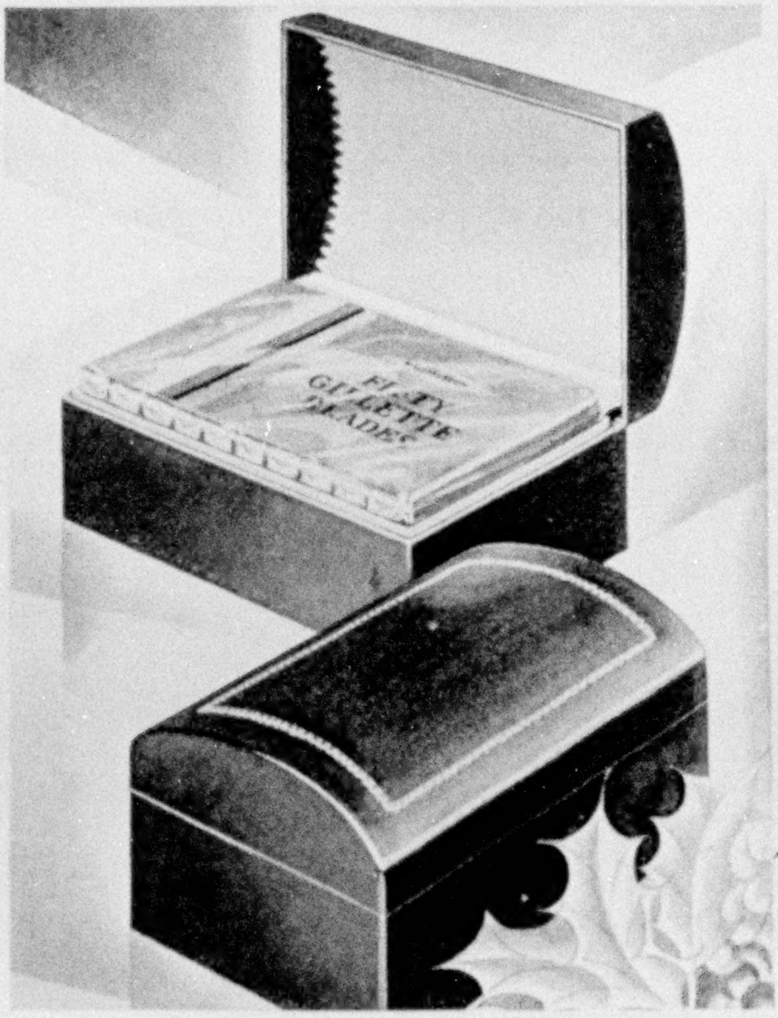
Our current list contains a wide choice of investigated issues. It will be sent on request.

The National City Company

National City Bank Building, New York

Offices or representatives in the principal cities in the United States, Canada, Europe, China, Japan, India, Australia, South America, Central America and the West Indies.

How to be *Generous*— to a man at Christmas



Five Dollars

JUST how does the Gillette Fifty Box qualify as the ideal Christmas gift for a man? Here's how—on these eight counts:

It is practical . . . Man, famous for his practical mind, insists on useful gifts.

Yet he probably wouldn't buy this for himself . . . From long habit, he is used to getting his blades in packs of five and ten. This will be a new and refreshing idea for him.

He'll be sure to use it . . . Blades are a daily necessity in every man's life. The Gillette Fifty Box is the most convenient way to have them.

It is personal . . . It's all to himself, for his own intimate, bathroom use.

It is good looking . . . Packed, as you see, in a metal box, velvet lined, with a spring-hinge cover. Blades are enclosed in brilliant Cellophane.

It is truly generous . . . With fifty smooth, double-edged Gillette Blades in easy grasp, a man can look forward to more continuous shaving comfort than he has probably ever enjoyed before in his life.

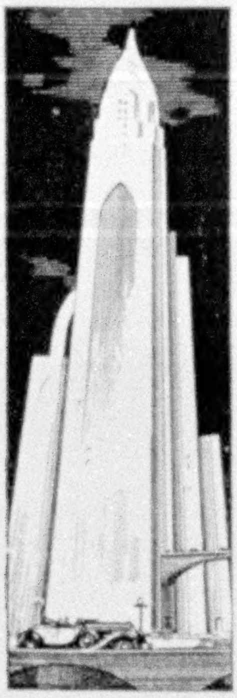
It will last well beyond the Christmas season . . . For months his mornings will be free from all thought of buying Gillette Blades.

It is reasonable in price . . . Five dollars buys this *ideal* gift. On sale everywhere.

GILLETTE SAFETY RAZOR CO., BOSTON, U. S. A.

Gillette

Give him shaving comfort in abundance with the famous Fifty Box of Gillette Blades



ALL ALONE!

WHAT the self-starter did for easy starting, what balloon tires did for easy riding, what hydraulic four-wheel brakes did for easy stopping the new Chrysler Multi-Range (transmission and gear shift) does for easy handling And what it accomplishes in advancing all-around performance is revolutionary. There is nothing else like it — nothing else near it Treat yourself to a thrilling new motoring experience. Go to your nearest Chrysler dealer for a demonstration.

ADDITIONAL FEATURES

- DOWN-DRAFT CARBURETOR
- SYNCHRONIZED POWER SYSTEM
- LARGER ENGINES
- ARCHITONIC BODIES
- PARAFLEX SPRING SUSPENSION
- METALWARE BY CARTIER
- WEATHERPROOF HYDRAULIC BRAKES

MULTI-RANGE CHRYSLER

© 1929 Chrysler Corporation

CHRYSLER MOTORS PRODUCT

ANY CAR
RUNS BETTER WITH ETHYL

YOU will see many improvements in the new car models at the automobile shows during the next few months. Just notice how many of them have the most far-reaching improvement of all—the high-compression engine.

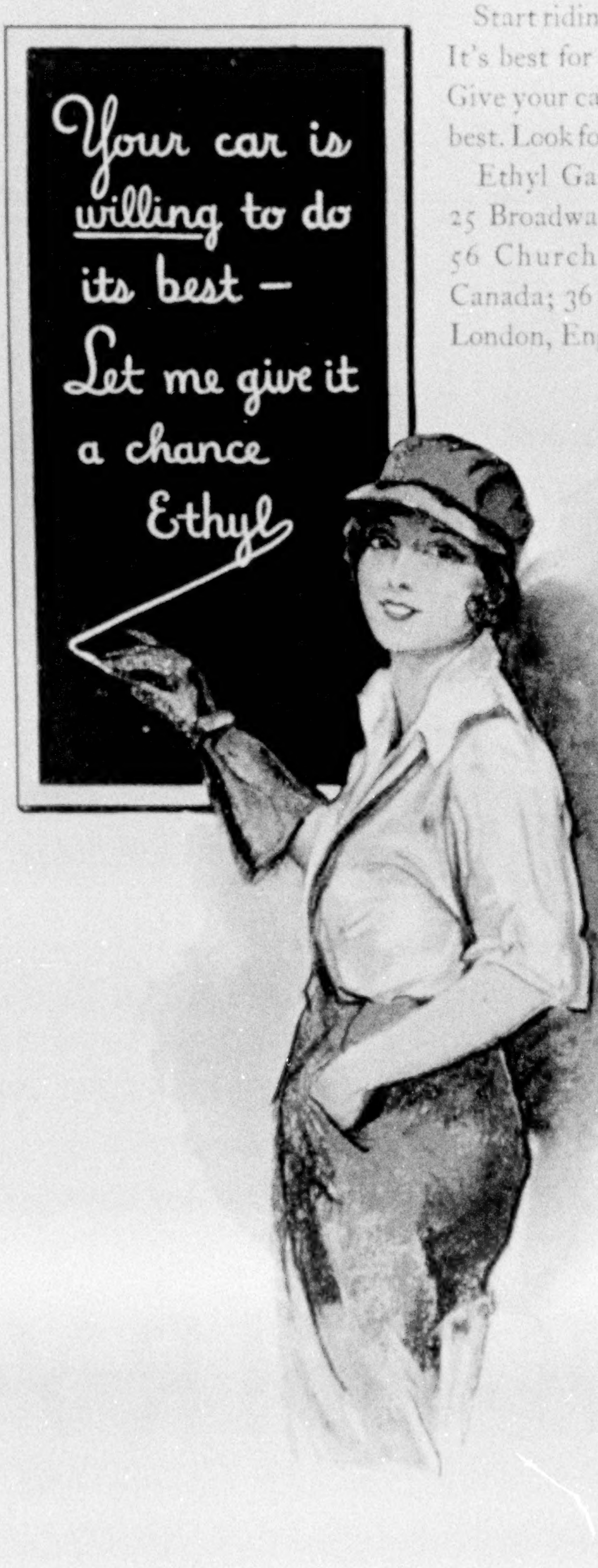
This past year more than three-fourths of the new cars have been of so-called high-compression (a 5 to 1 ratio or better). The 1930 models will raise the proportion even higher. Yet *three years ago only about one-tenth of all new cars were of this type!*

This great advance in all-round motoring efficiency and comfort was made possible by Ethyl Gasoline. The Ethyl fluid it contains eliminates "knock" under high pressures, enabling the engine to deliver its full power. Fuel of Ethyl's anti-knock quality is essential for the high-compression engine.

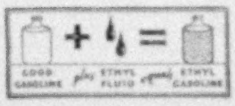
But Ethyl eliminates "knock" from *any* car, and produces power impossible to obtain with ordinary gasoline.

Start riding with Ethyl today. It's best for winter driving too. Give your car its chance to do its best. Look for the Ethyl emblem.

Ethyl Gasoline Corporation, 25 Broadway, New York City; 56 Church Street, Toronto, Canada; 36 Queen Anne's Gate, London, England. © E. G. C., 1929


Your car is willing to do its best –
Let me give it a chance
Ethyl

ETHYL
GASOLINE



WITH ETHYL
ANTI-KNOCK COMPOUND
ETHYL GASOLINE CORPORATION
Knocks out that knock

Powered by Lycoming

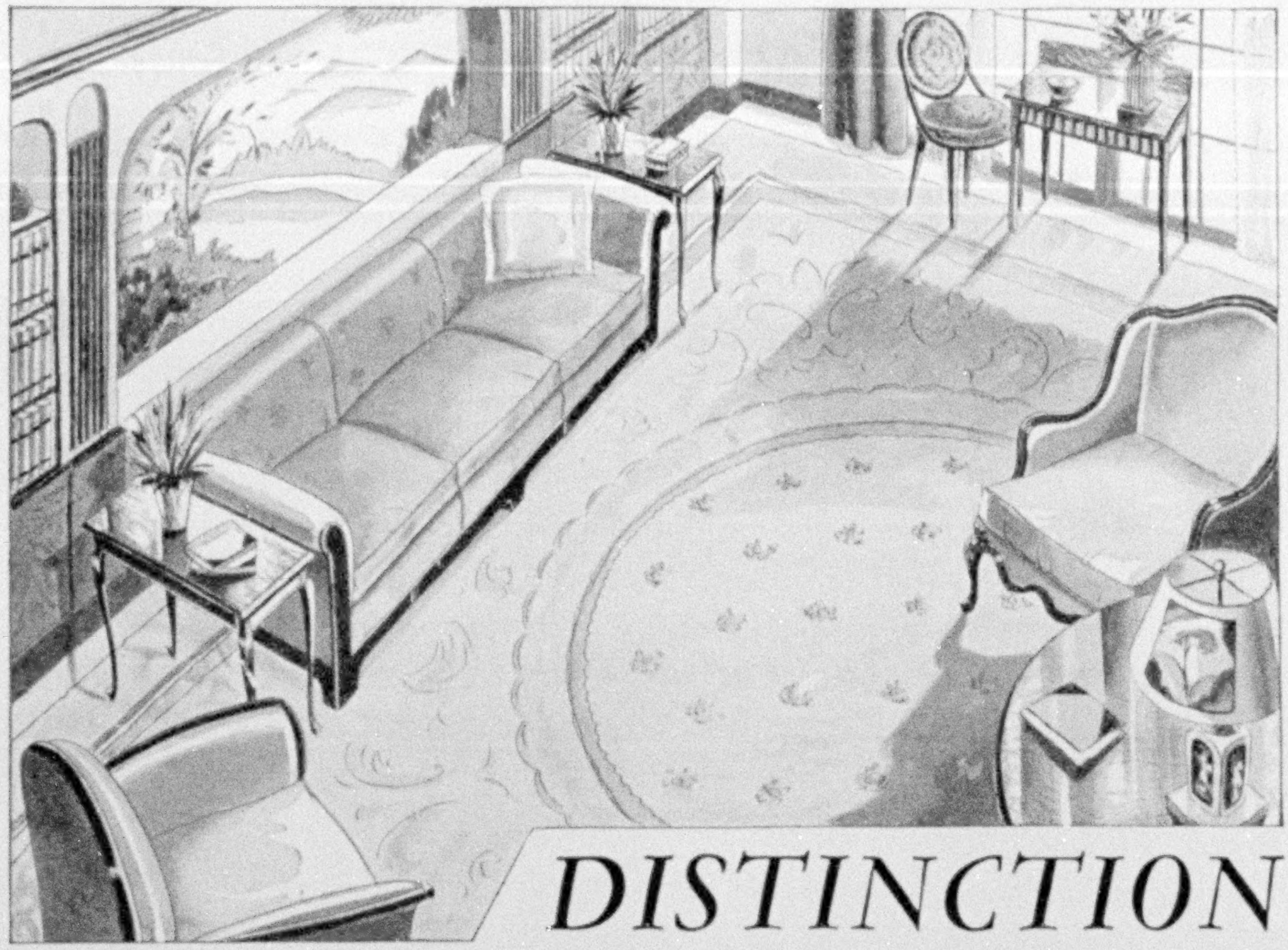
The Cord car creates a place for itself no other car has ever occupied

CORD FRONT DRIVE

SEDAN $3095
BROUGHAM $3095
CABRIOLET $3295
PHAETON $3295

Prices F. O. B. Auburn, Indiana. *Equipment other than standard extra*

AUBURN AUTOMOBILE COMPANY · AUBURN, INDIANA



DISTINCTION

. . . so easy to attain in a room if you but follow this simple rule

Of all the rooms you know, how few of them have any real distinction! Yet you can achieve that distinction in your own home, and at but triflingly more cost than you might pay for furnishings that together make—just another room.

The secret—no secret now for thousands of discriminating buyers—lies in the use only of genuine American Walnut furniture. For no matter what style you may prefer, you can be surer of finer workmanship, finer materials, finer design, if you insist upon furniture that is constructed with American Walnut on all exposed surfaces.

For manufacturers exert themselves when they work with American Walnut—admittedly the finest cabinet wood of the ages, and the favorite of master craftsmen. In such furniture, you can be sure of walnut's beauty throughout, on legs and framework as well as on paneled surfaces. And you can be sure of walnut's enduring charm, for American Walnut is unequalled in its resistance to the ravages of wear. And it is so easy to keep looking its best.

Our booklet: "The Story of American Walnut" will show you how to identify American Walnut, and will also give you many valuable hints on furnishing your home as well as caring for your furniture. Use this coupon to secure a copy.

AMERICAN WALNUT

AMERICAN WALNUT

American Walnut Manufacturers Association

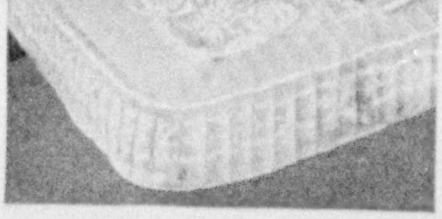
Room 2709, 616 S. Michigan Ave.
Chicago, Ill.

Please send me your brochure "The Story of American Walnut."

*Name*____________________ *Address*____________________

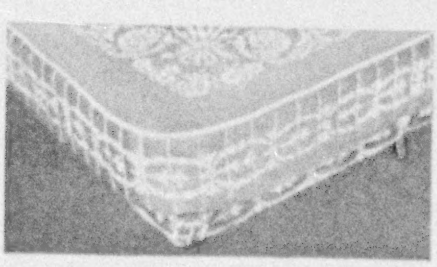
*"I envy Gene Tunney his nerve control more than his strength or agility," wrote William Lyons Phelps in Delineator for July.** *And in maintaining this nerve control and keeping in condition the world's heavyweight champion considers sleep an important factor.*

"Sound Sleep is more necessary than exercise or food," *says* GENE TUNNEY



$39.50

Simmons Beautyrest Mattress. A heart of resilient wire coils, in separate pockets, makes it buoyant. Thick upholstery, damask cover.



$42.50

Simmons Ace Box Spring. Seasoned lumber frame, steel-braced. Finely tempered wire coils hand-tied eight times. Upholstered and covered like Beautyrest.

"WHEN preparing for a competition in which physical endurance and mental alertness are required, sound, undisturbed sleep is more necessary than exercise or food," says Gene Tunney.

"Exercise and digestion consume nerve-energy, which is the motive power of the living machine—Man. Sleep and rest are the mediums through which this destroyed nerve-energy is restored.

"A wise athlete when preparing for athletic competition makes it a rule to get ten hours of sleep and rest a night. This long rest, after the hard daily grind, will completely refresh his nerves and fit him for the next day's grind, gradually conditioning him for the great event—the contest."

* * *

What Gene Tunney says about sound sleep is surely of interest to all. The Simmons Company, through its marvelous bed equipment, brings restful sleep within reach of everyone. Simmons Beautyrest Mattress, $39.50; Deepsleep Mattress, $19.95; Ace Box Spring, $42.50; Ace Open Coil Spring, $19.75. The Simmons Company, New York, Chicago, Atlanta, San Francisco.

(Copyright 1929, The Simmons Company)

SIMMONS

BEDS · SPRINGS · MATTRESSES
BERKEY & GAY FURNITURE

*On request The Simmons Company, 666 Lakeshore Drive, Chicago, Ill., will be glad to send any boy a photograph of the champion and a reprint of this article, "Gene Tunney Shows the Way."

GREAT WHITE FLEET

GREAT WHITE FLEET

Are you *only* an armchair Nomad?

WHISKED AWAY to far-off lands by the magic of the printed page, do you cease to dream of roaming when you close the book? Or do you resolve to see for yourself the romantic Caribbean lands?

A long, expensive cruise is unnecessary. Just a few days south of us lies Cuba, where Havana and Santiago invite you. In Jamaica, Kingston and Port Antonio; in the Panama Canal Zone, Cristobal and Panama City. In Costa Rica is lazy old Port Limon. Santa Marta, Puerto Colombia, and Cartagena will make you want to tarry in Colombia; Guatemala will show you the charm of Puerto Barrios and Guatemala City. In British Honduras you will see brisk little Belize, and in Spanish Honduras, Puerto Castilla and Tela.

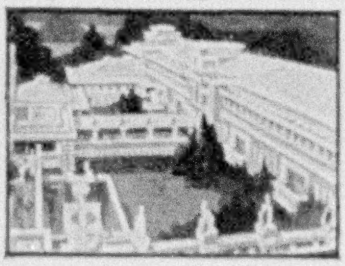
Great White Fleet liners leave New York twice weekly and New Orleans three times weekly. Cruises from 9 to 24 days. First class passengers only. All shore trips, hotel and railway accommodations included. Write for complete information to

Passenger Traffic Department
UNITED FRUIT COMPANY
Steamship Service
Room 1624, 17 Battery Place, New York City

CARIBBEAN
via
GREAT WHITE FLEET

Japan

The Year's at the Spring:
All's Right with the World:



Spring is a poetic fact in Japan... not just a word used by poets. Let the "unrest of spring" carry you to the Island Empire where you'll find deep rest and delight as you view the cycle of blossoms, made even more picturesque by native pilgrimages and festivals ... in a land retaining ancient ceremonial and beauty, and offering as well the up-to-date facilities of modern hotels and railroads.

Cherry blossoms in April flood the fields with fragile loveliness. Pine trees girdle temple hills under the clear moon. Little tea-houses wear a vivid screen of lanterns. Sea-side and curative resorts afford a picturesque background for golf and tennis all the year round. In summer you make an exciting ascent of superb Fujiyama.

It is like taking part in a many-colored motion picture, and yet meeting real and hospitable people with a reverence for their past and a genius for utilizing modern progress and invention.

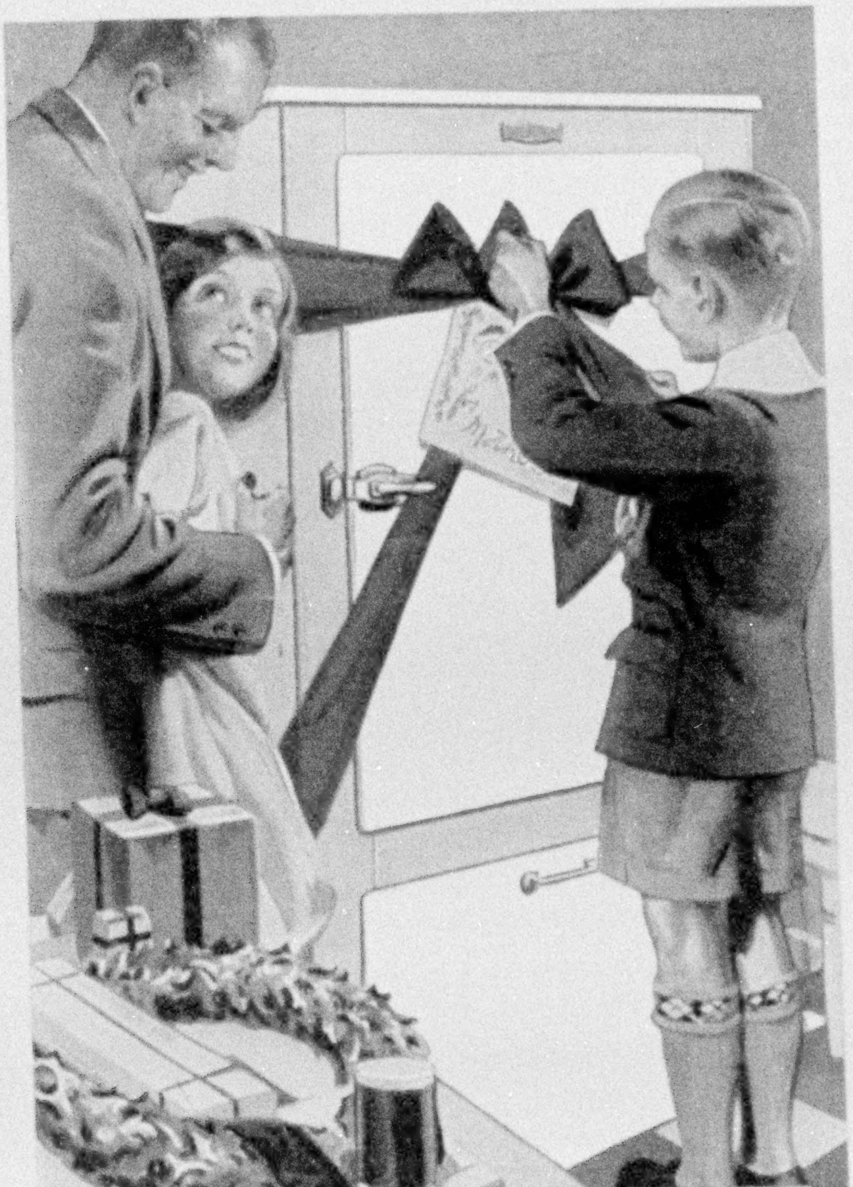
All details of your trip, including a carefully planned itinerary of Japan's interest points, arranged without charge. Write today for fascinating booklet on Japan.

Steamship Lines operating between the United States and Japan: *Nippon Yusen Kaisha, Osaka Shosen Kaisha, American Mail, Canadian Pacific, Dollar Line.*

JAPAN TOURIST
BUREAU

c/o JAPANESE GOVERNMENT RAILWAYS
1 Madison Ave., New York City
and c/o NIPPON YUSEN KAISHA
545 Fifth Ave., New York City
or offices of American Express Co. and
Thos. Cook & Sons,
or any tourist or steamship agent.

Some day you'll buy her a Frigidaire . . . *why not for Christmas*

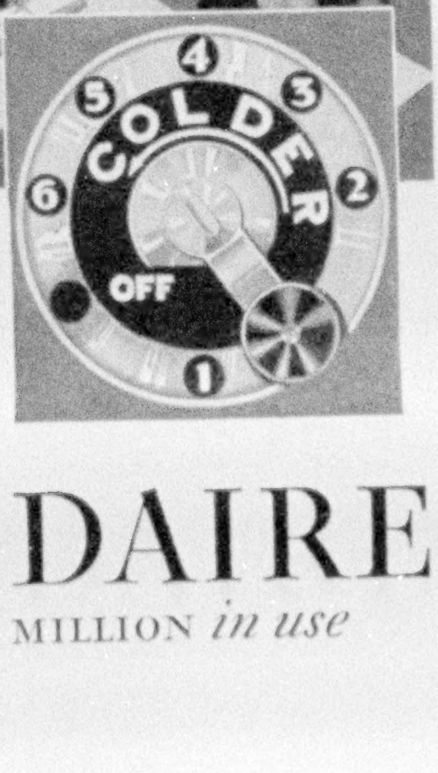


OF course, she wants Frigidaire! And some day you'll buy it. So why not make that *some day* now? Give her a Frigidaire for Christmas.

Give her the convenience of making desserts with the famous Frigidaire "Cold Control." Give her the care-free, healthful refrigeration assured by Frigidaire's surplus power. Give her the advantages of self-sealing freezing trays that permit two widely different temperatures in the same cabinet.

In other words, give her a *real* Frigidaire . . . one with the Frigidaire name-plate on it. Then you'll be *sure* she'll have a truly *modern* electric refrigerator. She'll have a cabinet of striking beauty in Tu-Tone Porcelain-on-steel. She'll have the incredible quietness of the Frigidaire power unit . . . a unit that is out of sight and away from dust and dirt. And she'll have conveniently arranged shelves at a height that makes stooping unnecessary.

And it's *easy* to give her a Frigidaire. Prices are low and terms can be arranged to suit your convenience. Call at the nearest Frigidaire display room and have Frigidaire in your home on Christmas morning. Frigidaire Corporation, Subsidiary of General Motors Corporation, Dayton, Ohio.



Do not confuse the "Cold Control" with Frigidaire's temperature regulator which automatically controls food compartment temperatures. The "Cold Control" speeds freezing *at will* in the freezing trays.

FRIGIDAIRE CORPORATION,
Department Y-322, Dayton, Ohio.

Please send me a copy of the Frigidaire recipe book. Also the Frigidaire catalog.

Name..

Address..

City............................*State*..................

FRIGIDAIRE

More than a MILLION *in use*

Forests of Palms
Interior Cuba

CUBA

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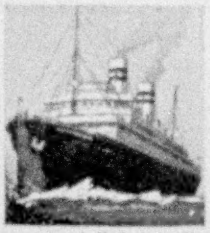

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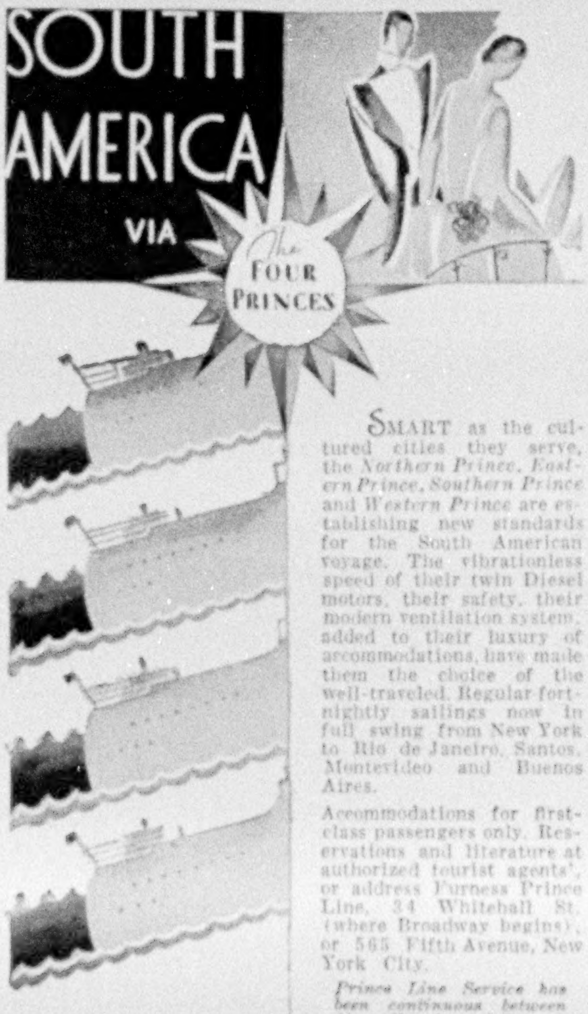

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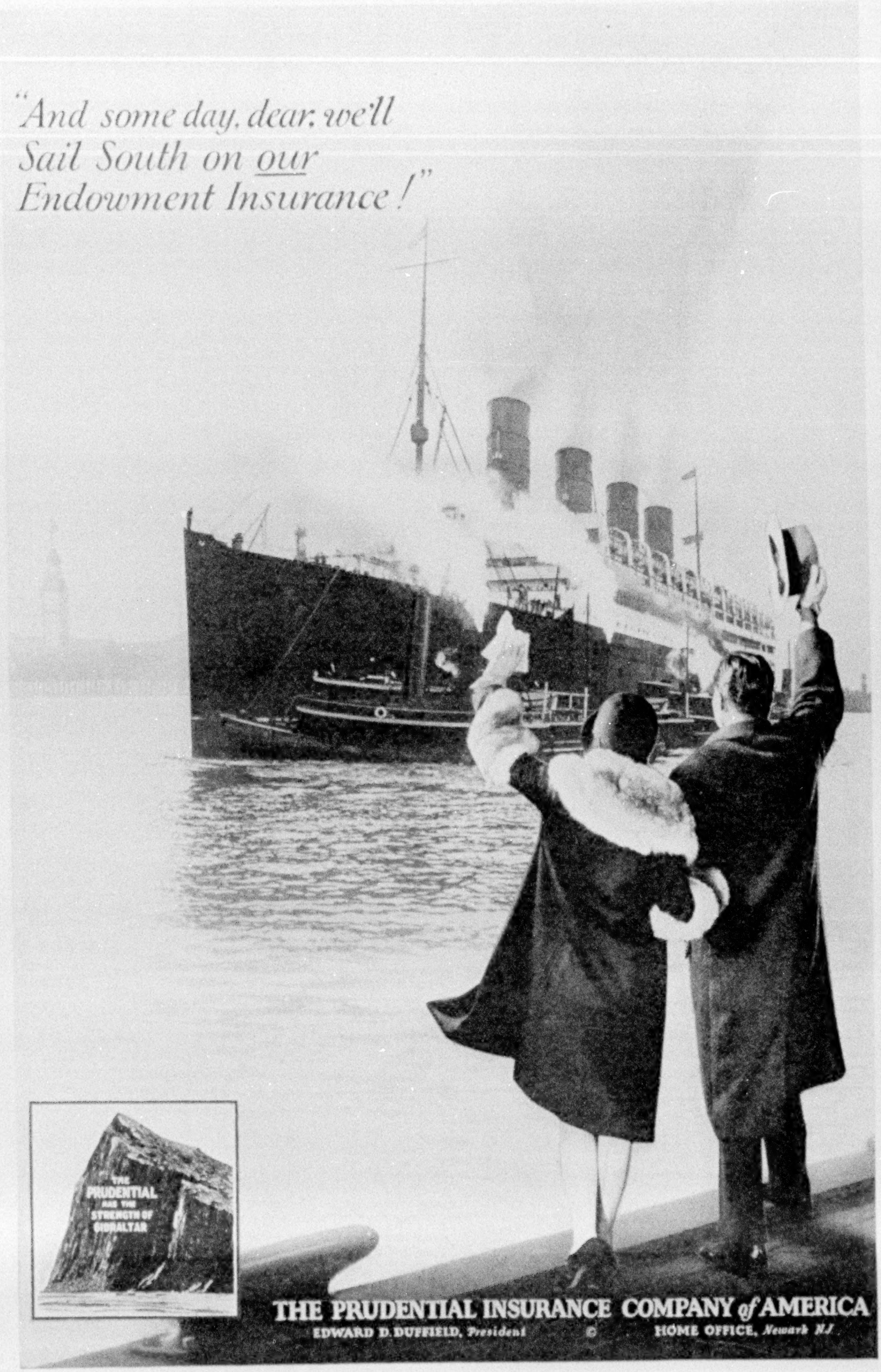

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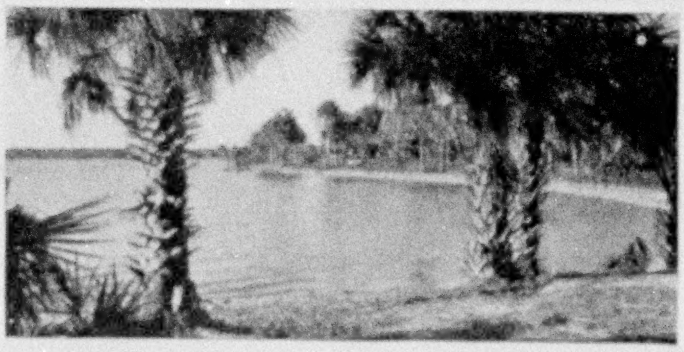

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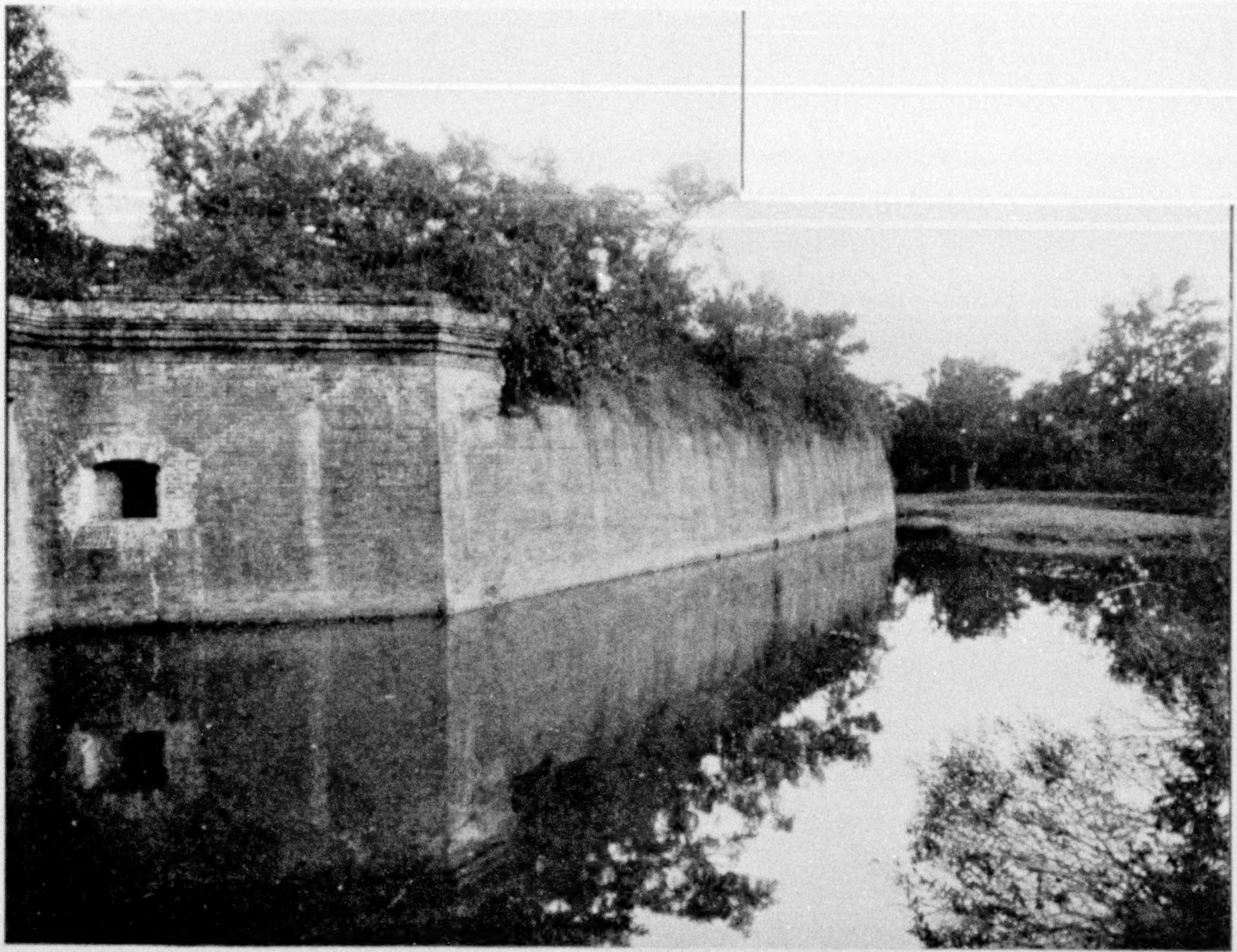

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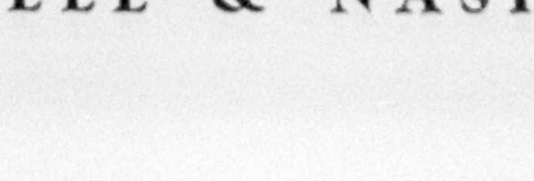

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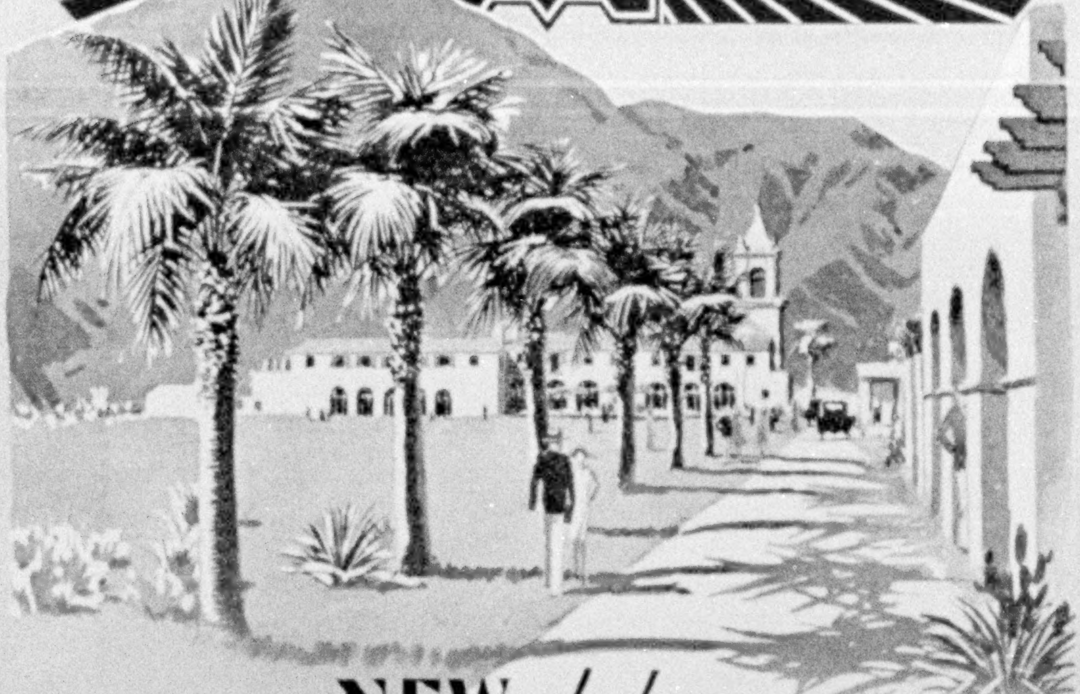

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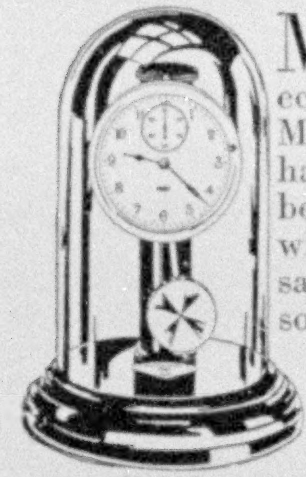

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MAKES an ideal present for the Business Executive—the Professional Man—for ANYONE who has need for time that must be accurate—always. We will send it for you—pack it safely—and enclose a handsome, engraved Christmas gift card bearing your name. Last Christmas hundreds were made happy by a Poole Clock, the one gift that is a continuous reminder of your thoughtfulness.

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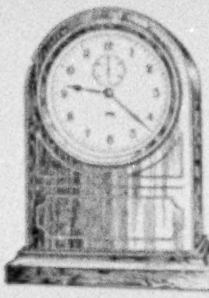

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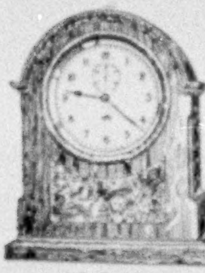

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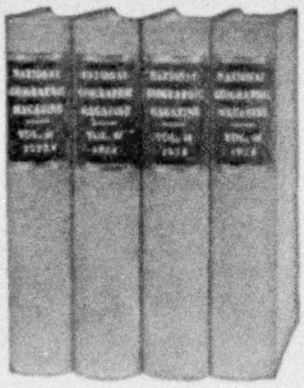

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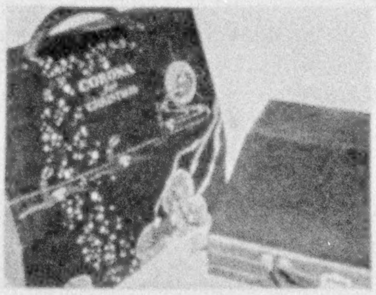

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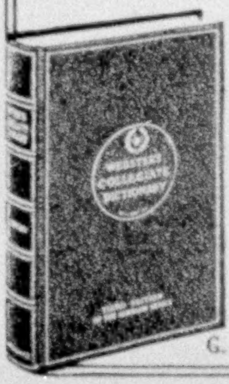

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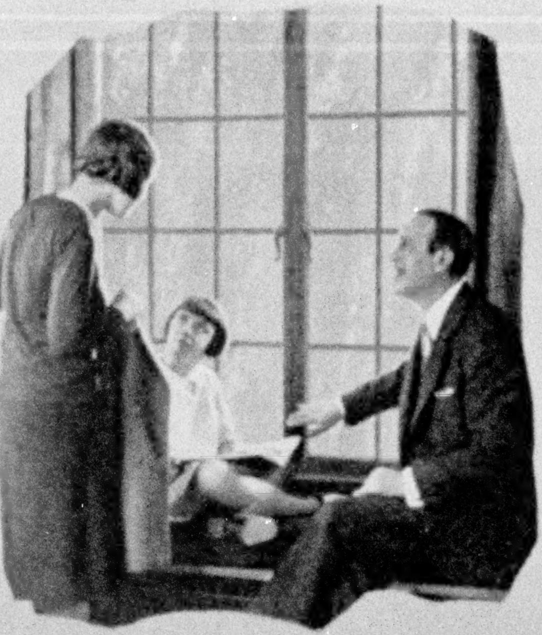

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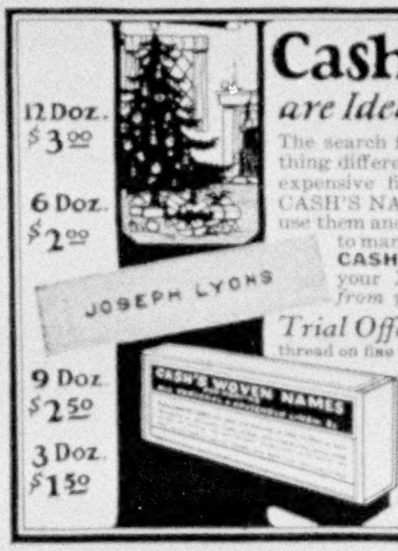

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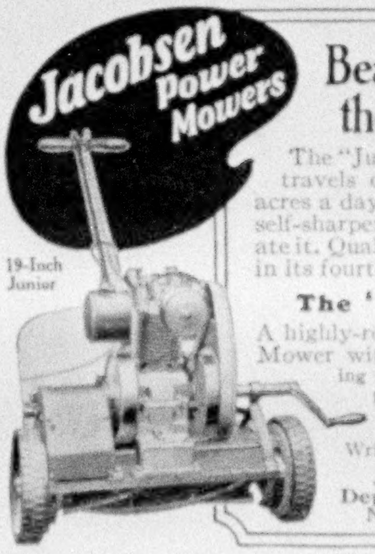

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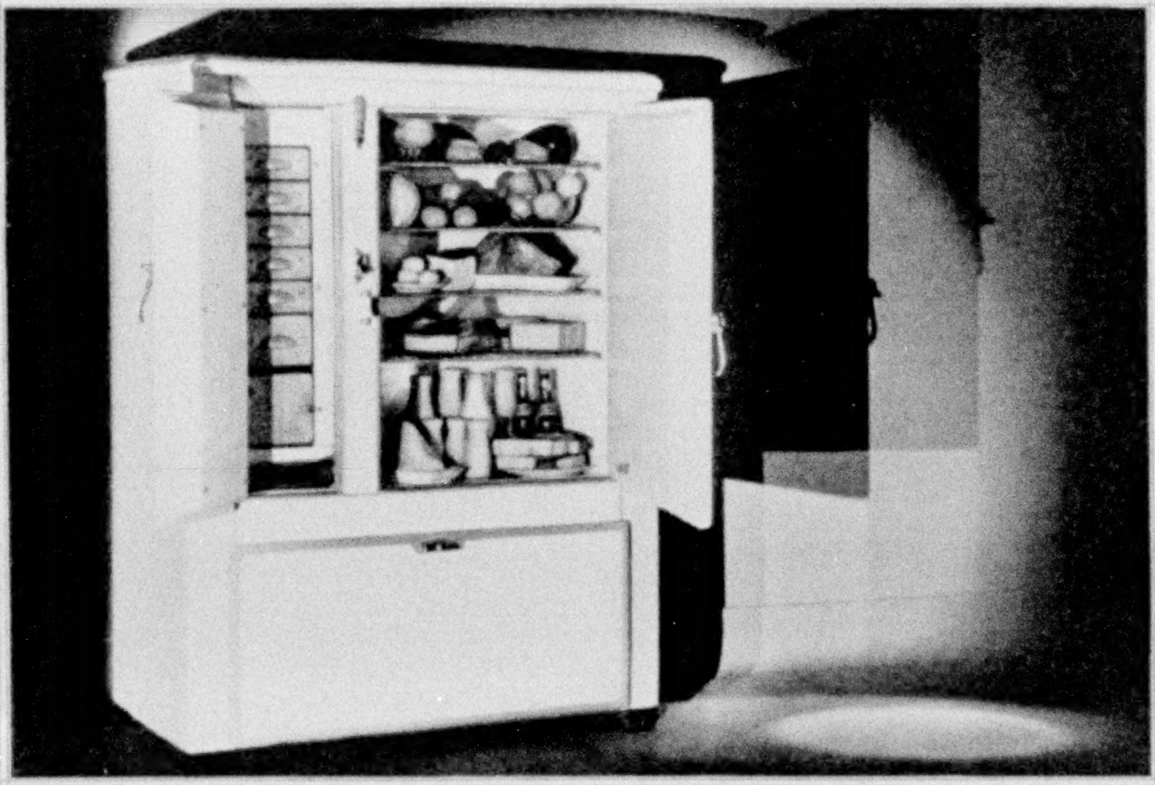

KELVINATOR, never deviating from its path of making electric refrigeration even more convenient, more trouble-free, and more economical, has designed its newest product to be 100% automatic in operation.

A new Kelvinator discovery — Ice-O-Thermic Tubes — makes possible far faster freezing of ice cubes. In special fast-freezing trays, ice and delicious desserts are prepared in an amazingly brief period. Yet food compartments remain always at the same safe temperature of 40 to 50 degrees — neither too warm nor too cold.

With the new Super-Automatic Kelvinator you won't need to worry or watch over your refrigerator to obtain these benefits.

In the larger Kelvinator models you even obtain separate cold storage where fish, game, and ice cream may be kept for indefinite periods. Each new Kelvinator — and they are priced as low as $185 f. o. b. Detroit — is of sturdy metal construction, porcelain-lined throughout. Chromium-plated and Butler nickel hardware in dull finish, adds to the attractive appearance and durability of these models.

A Different Christmas — A Different Future — For the Whole Family

Wives and husbands all over America will provide future food healthfulness and food economy by installing the new Kelvinator for the family's Christmas. Under Kelvinator's ReDisCo monthly budget plan, the family budget will hardly be disturbed by the modest cost of installation. See all the new Kelvinators now, and be sure to order the size you need in your home for Christmas.

KELVINATOR CORPORATION, 14258 PLYMOUTH ROAD, DETROIT, MICHIGAN
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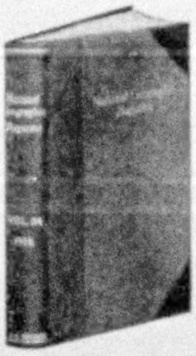

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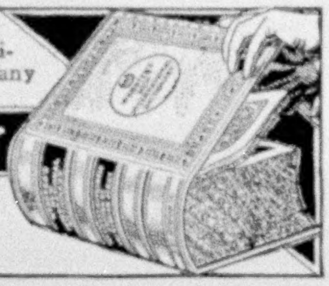

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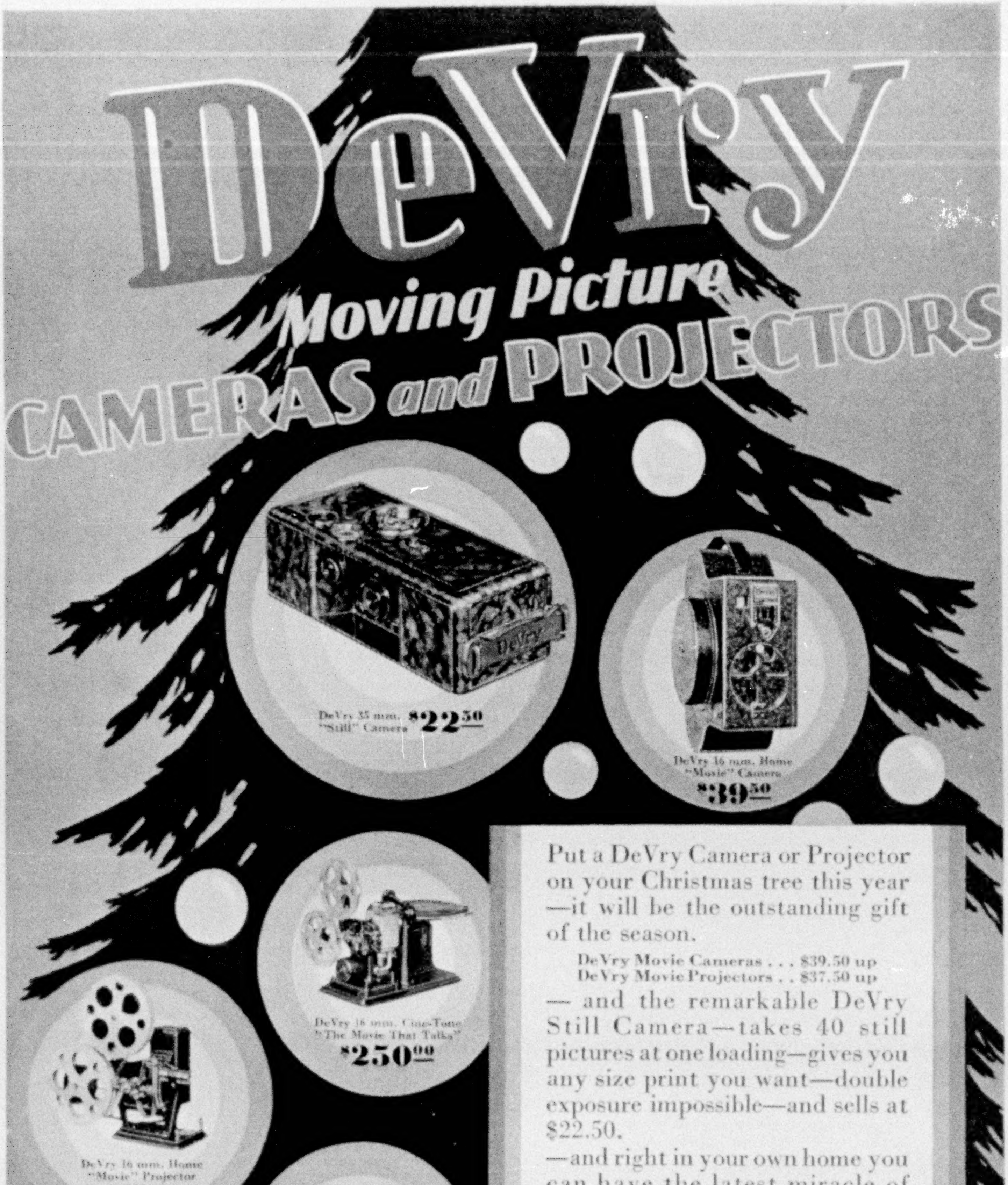

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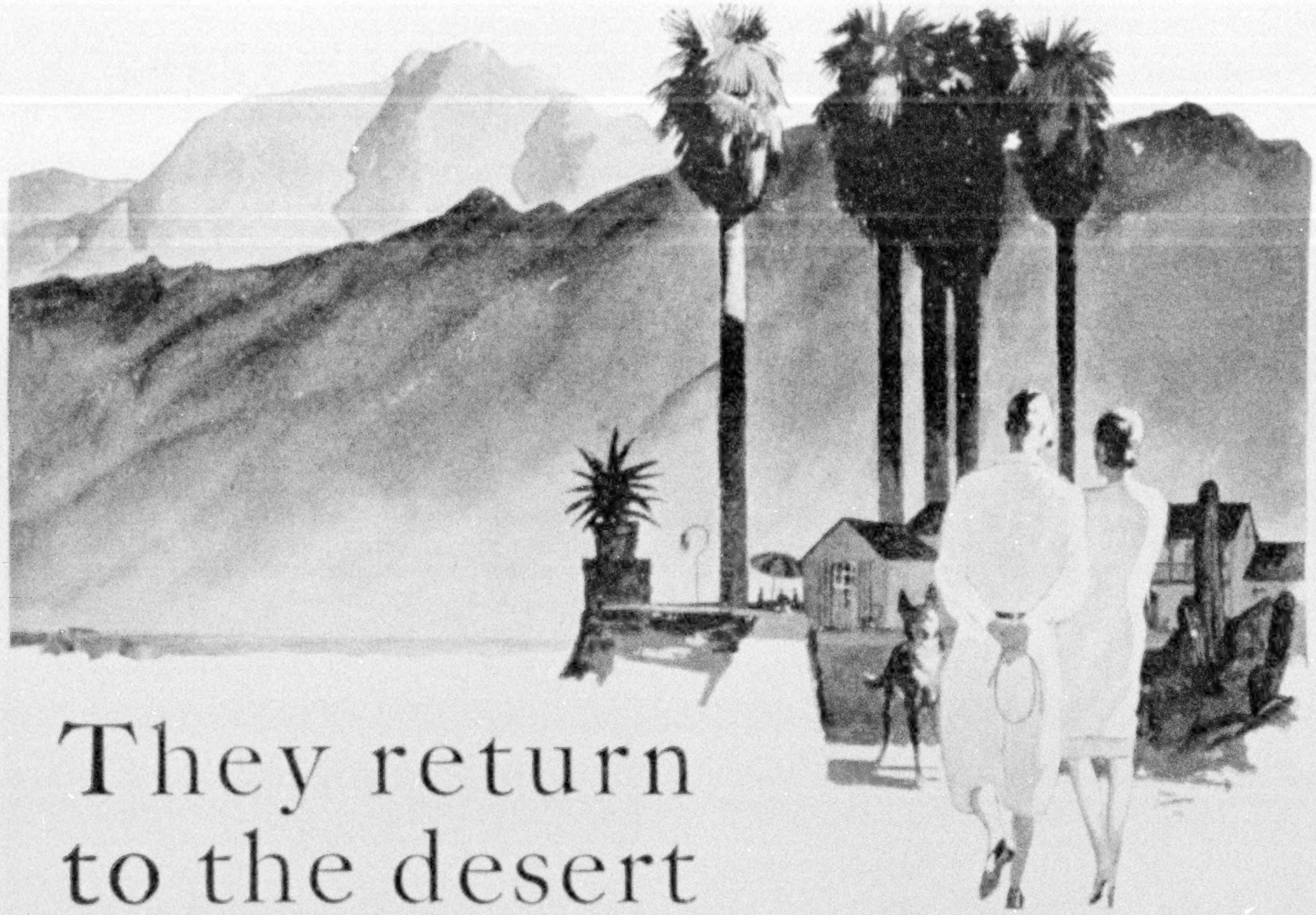

They return to the desert

Just a year ago—last winter—they discovered the desert. Santa Barbara bound on the "Golden State Limited," a globe-wanderer had pictured for them a miracle in restfulness;—barely hidden from the steel path of their speeding train. Curious, they stopped at Palm Springs. There, and at neighboring Indio, they found unique hotels which had cheated and charmed the desert. They learned why, before them, fame-marked author, song-writer, financier, had sought out these oases.

Now they were returning to the desert. The reason? You will catch some part of it in their stumbling phrases: "escape . . . vague peace . . . the open sky . . . winter sun . . . low-swung stars of the desert night . . . creaky, leathery song of the saddle . . . informality . . . tranquillity . . . purple shadows . . . rest."

Stumbling phrases. But there is no mental mirage about the winter resorts of this Southern California magic desert. America has discovered the desert. Up from the Salton Sea it rolls its arid way and stops before the palmed oases close-nestled against Mt. San Jacinto.

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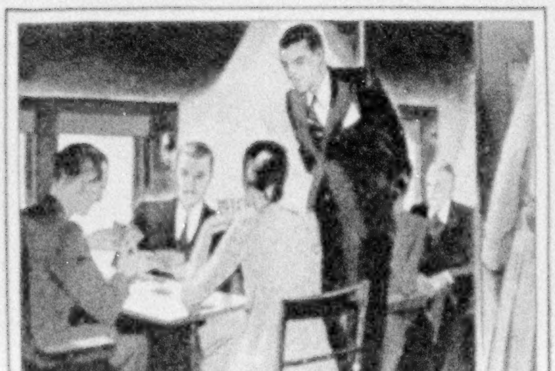
Noon-day's highest temperature averages 81°; nights average 45°.



Rooms en suite . . . every refinement of travel comfort distinguishes these trains.—"Golden State Limited," "Sunset Limited."

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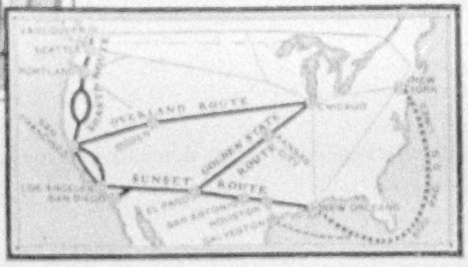
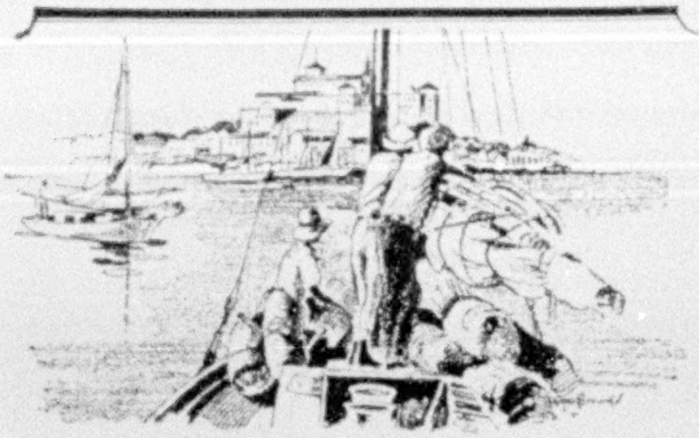


Write to E. W. Clapp, 310 So. Michigan Blvd., Chicago, or H. H. Gray, 531 Fifth Ave., New York City, for Booklets: "Guest Ranches of Arizona" and "California Desert Resorts".



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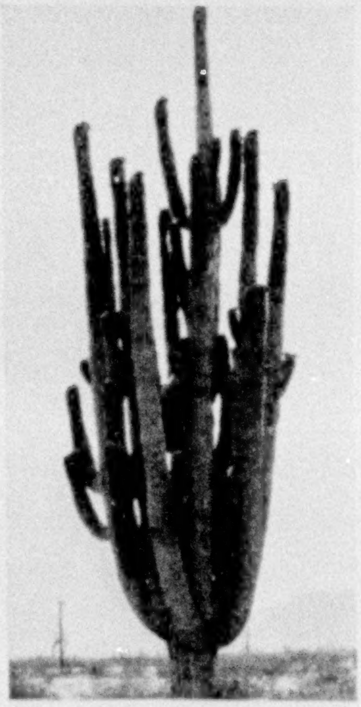

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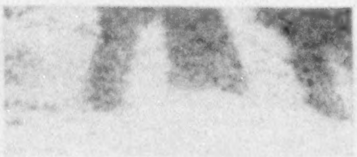

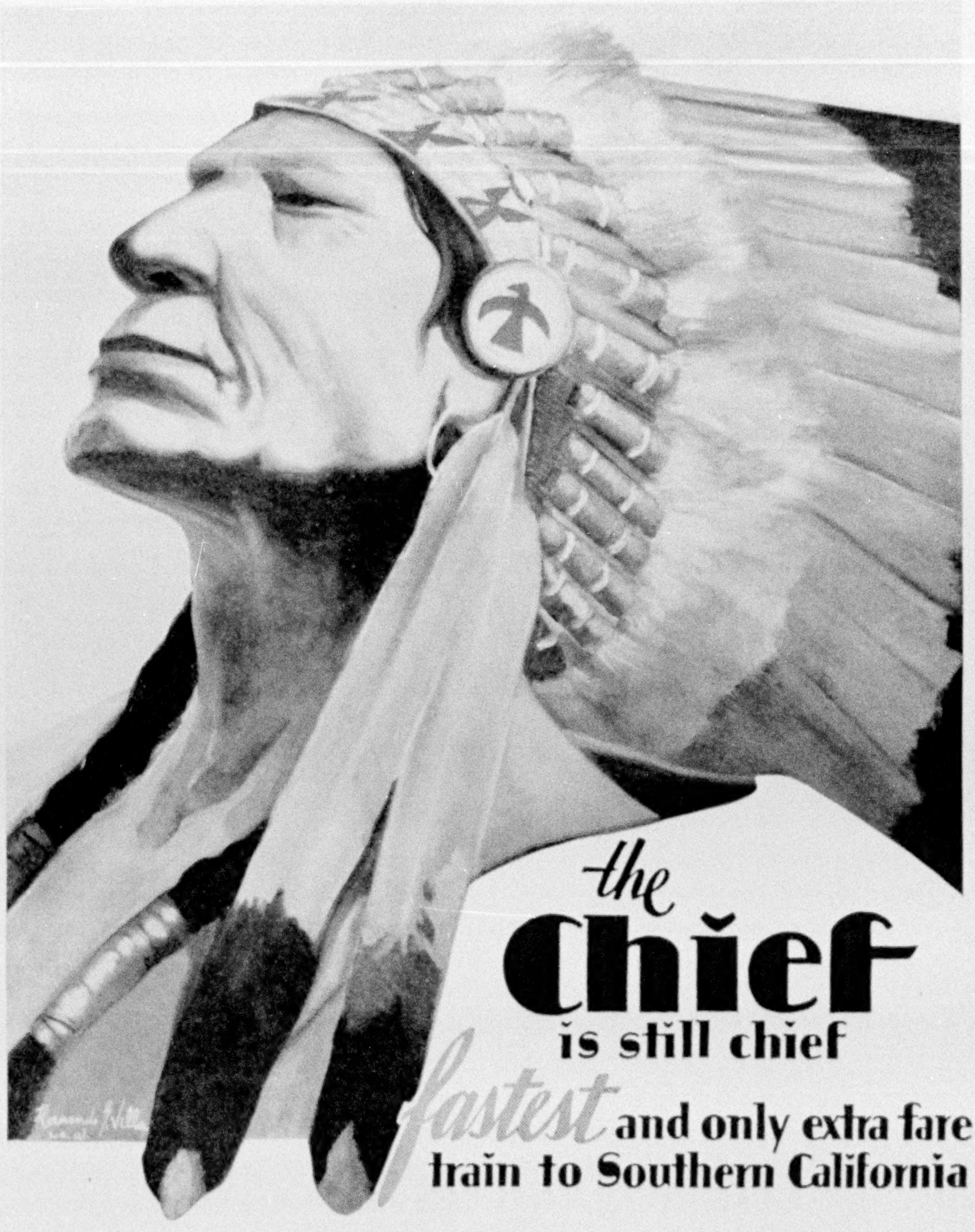

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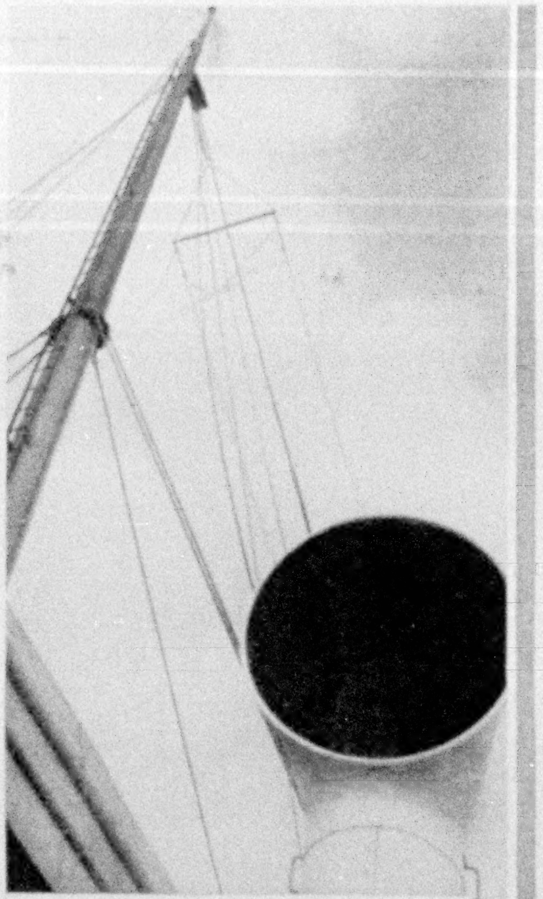

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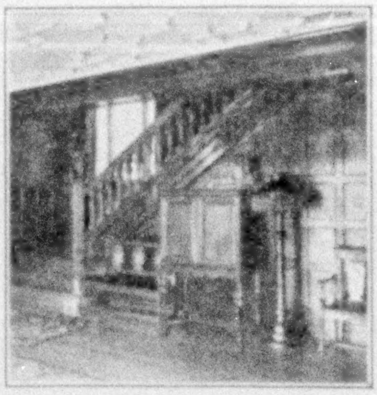

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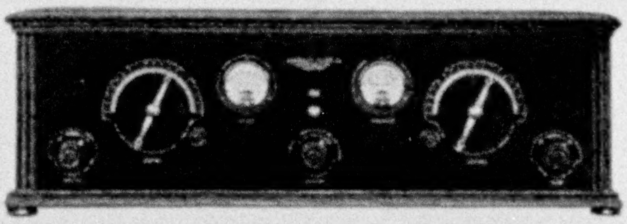

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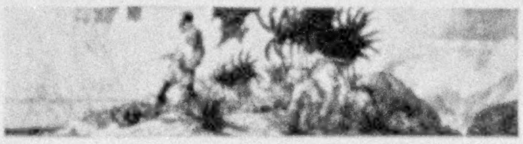

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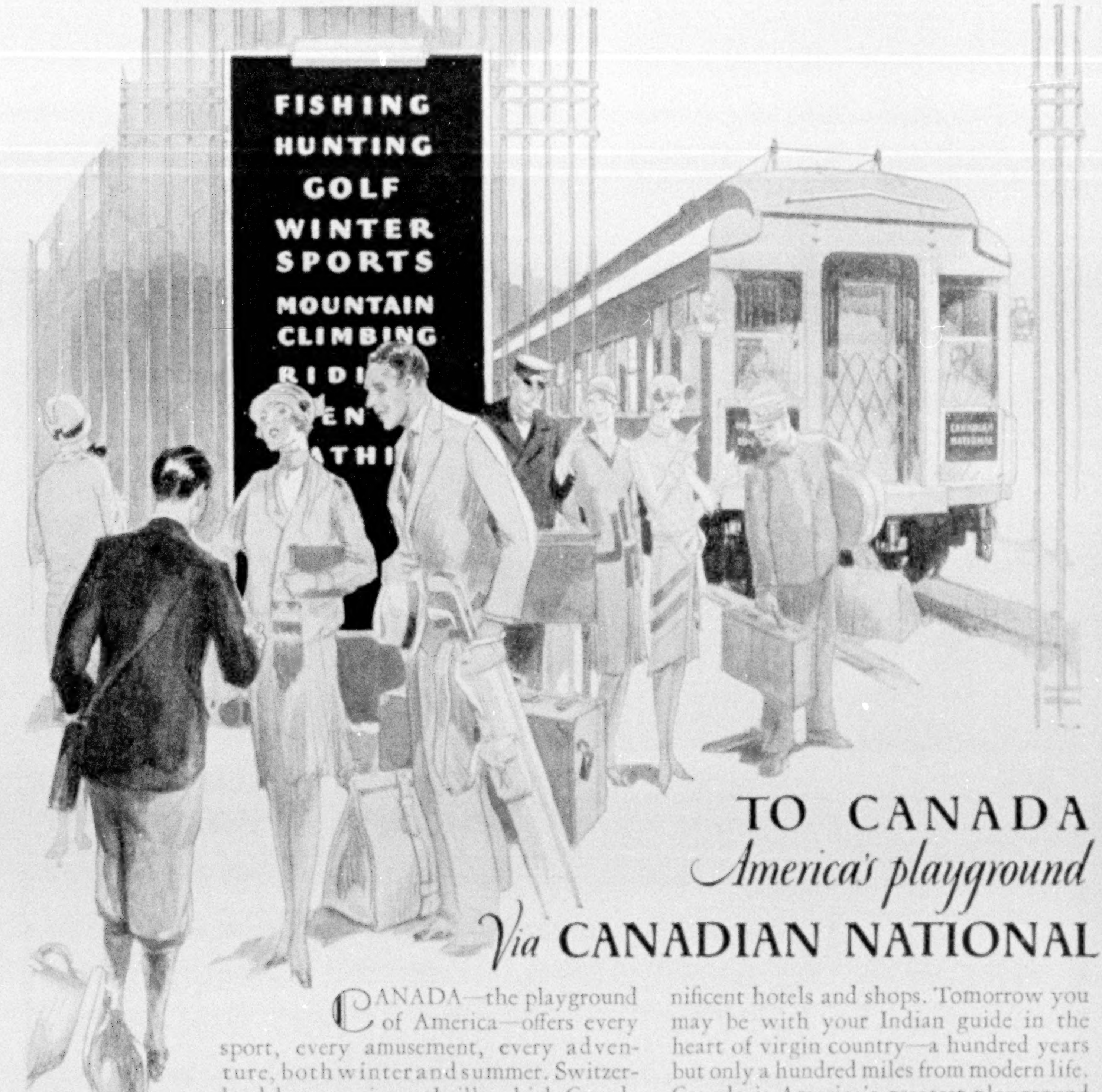

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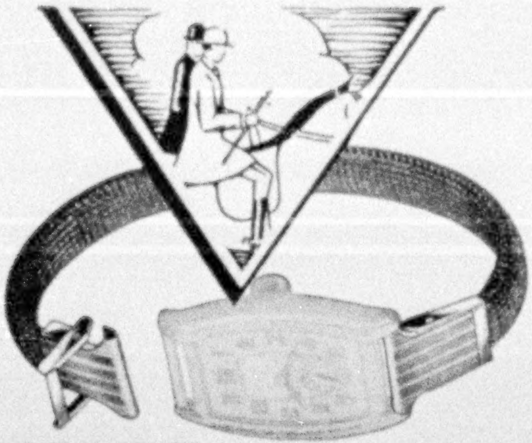

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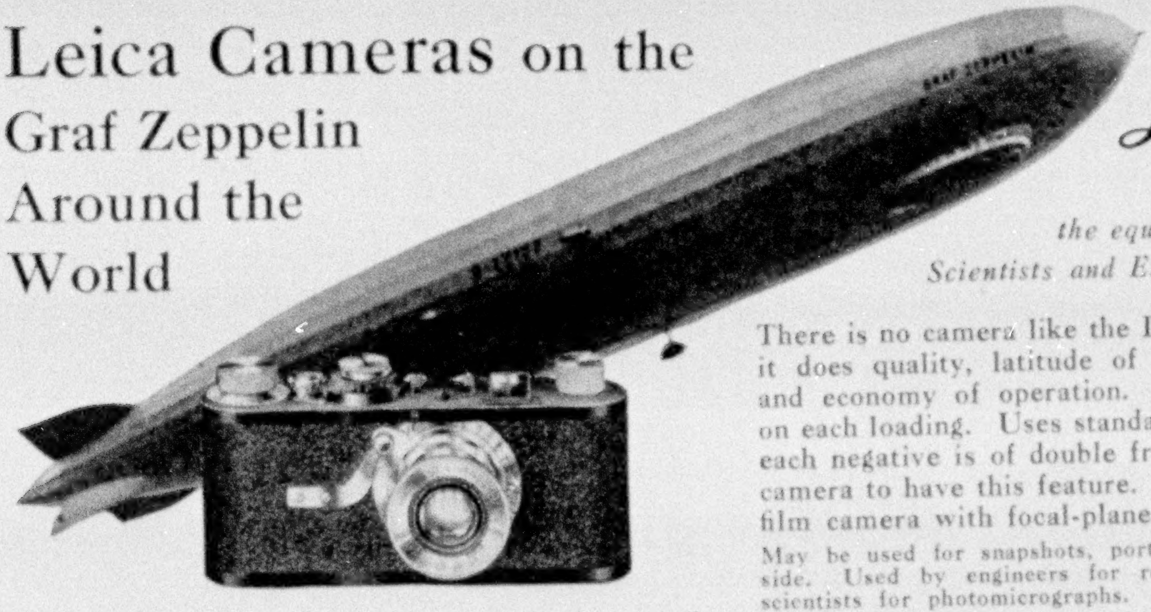

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On the Graf Zeppelin's west-bound trip one of the several Leica Cameras on board was used to photograph the *interior* of the torn bag. Motion prevented time exposures. The only light was that reflected from the ocean through the ripped opening, yet the pictures were remarkably clear.

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12-29

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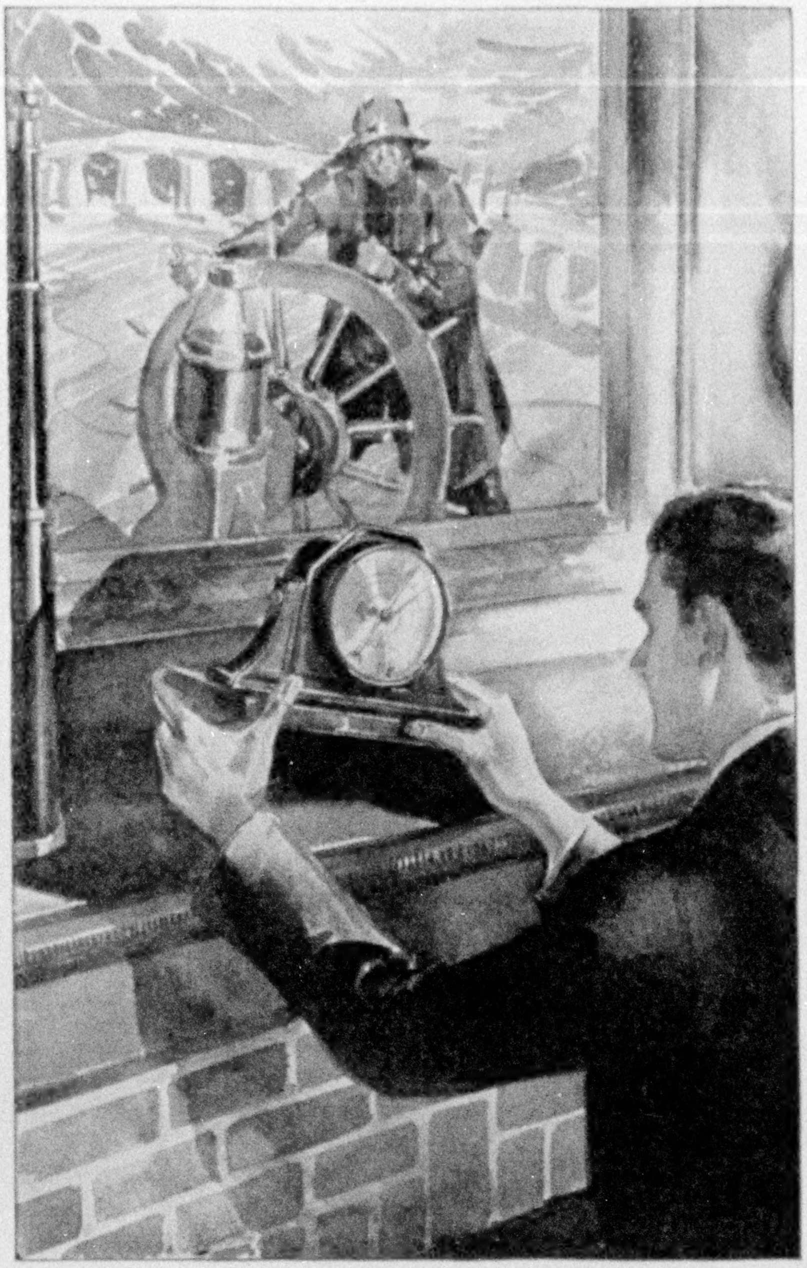

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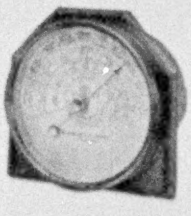

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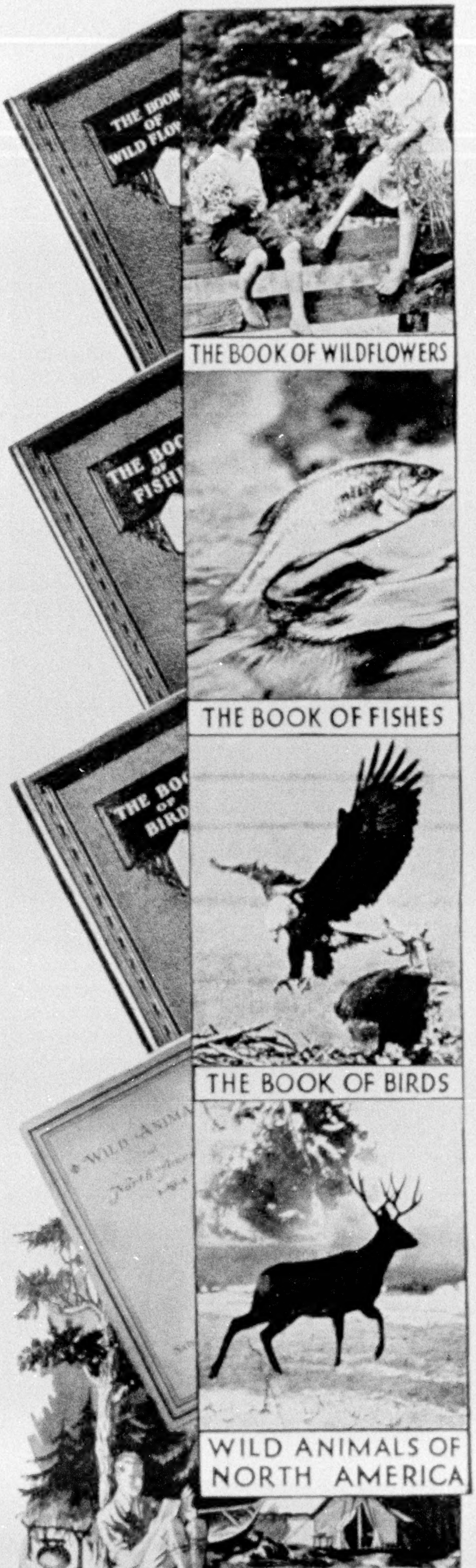

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IS SOME member of your family a lover of the outdoors? Do you have friends living in suburbs, small towns or rural communities? Or others who take vacations at mountain, lake or seaside camp?

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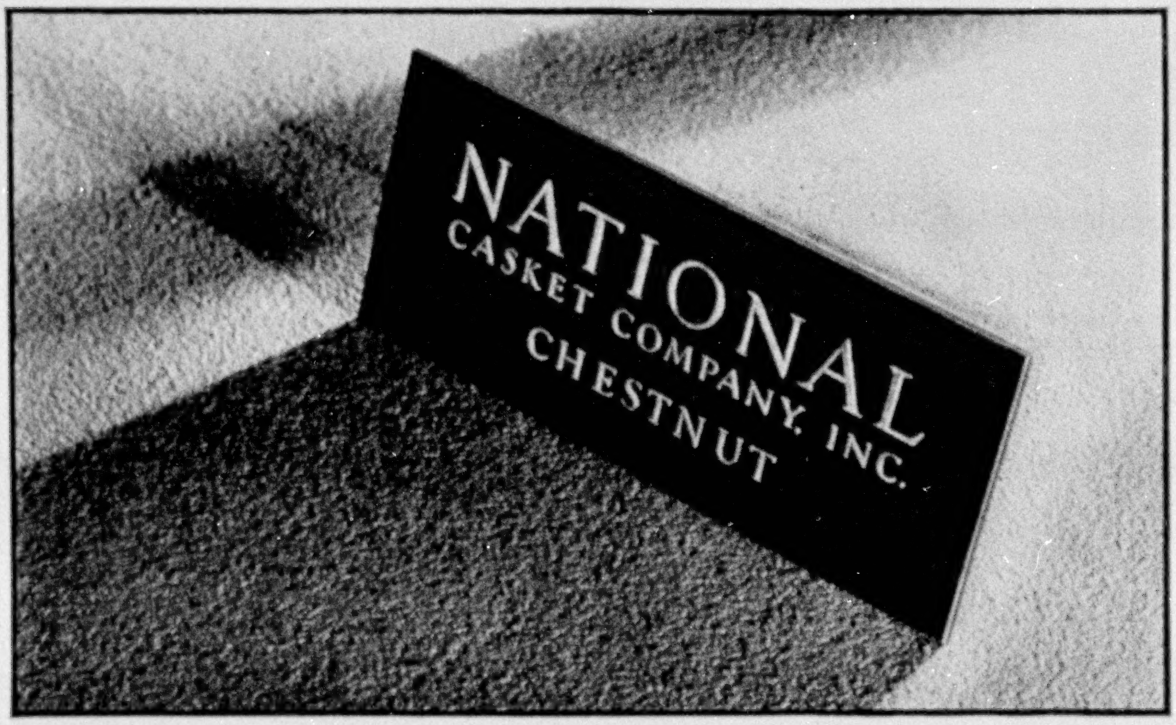
There is such a means . . . the trademark shown below, which appears on every National casket. Inconspicuously placed, it is nevertheless always plainly visible.

This trademark identifies the casket as a product of the country's leading manufacturer. It states of what material the casket is made . . . bronze . . . copper . . . Armco Ingot Iron . . . mahogany . . . oak . . . chestnut. It is the purchaser's guarantee of quality workmanship. It pledges the authenticity of the design. It is backed by a reputation for manufacturing reliability extending over nearly half a century.



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We have prepared a booklet, "Funeral Facts." It contains much that we believe may be very helpful in time of need. We shall be glad to send a copy upon request. Just write Dept. G 3, 60 Massachusetts Avenue, Boston, Massachusetts.

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KREMENTZ GIFTS - *for him* -
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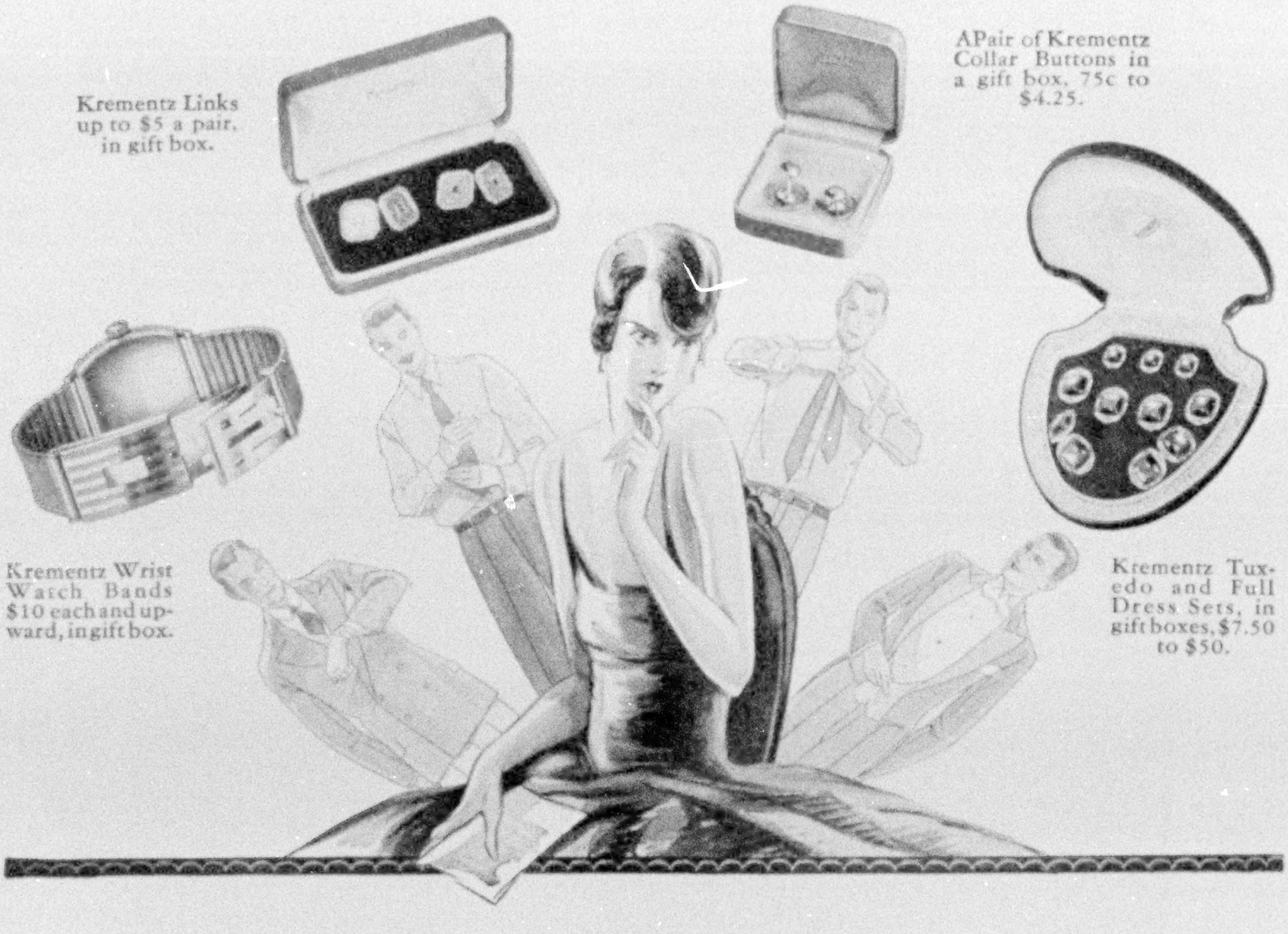

Krementz Links up to $5 a pair, in gift box.

A Pair of Krementz Collar Buttons in a gift box, 75c to $4.25.

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"*WHAT shall I give him for Christmas?*

"*What will please him most?*

"*If I could only think of something he would cherish—not only because I gave it to him, but because it was something he really wanted.*"

All over the country, mothers, wives, sweethearts, sisters, and aunts are asking themselves these questions. All over the country, the better stores are answering these questions with Krementz Jewelry for Men. Appropriate gift boxes.

The name Krementz is not only a "hall-mark" for Quality, but for Style and Good Taste. Krementz stylists are continually in touch with what is accepted by the best dressed men at the fashion centers both here and abroad. Continental tendencies are minutely observed. Write us for names of stores near you. New Yorkers may phone our Fifth Avenue Office, LACkawanna 3123. KREMENTZ & CO., *Makers of Fine Jewelry since 1866,* Newark, N. J.

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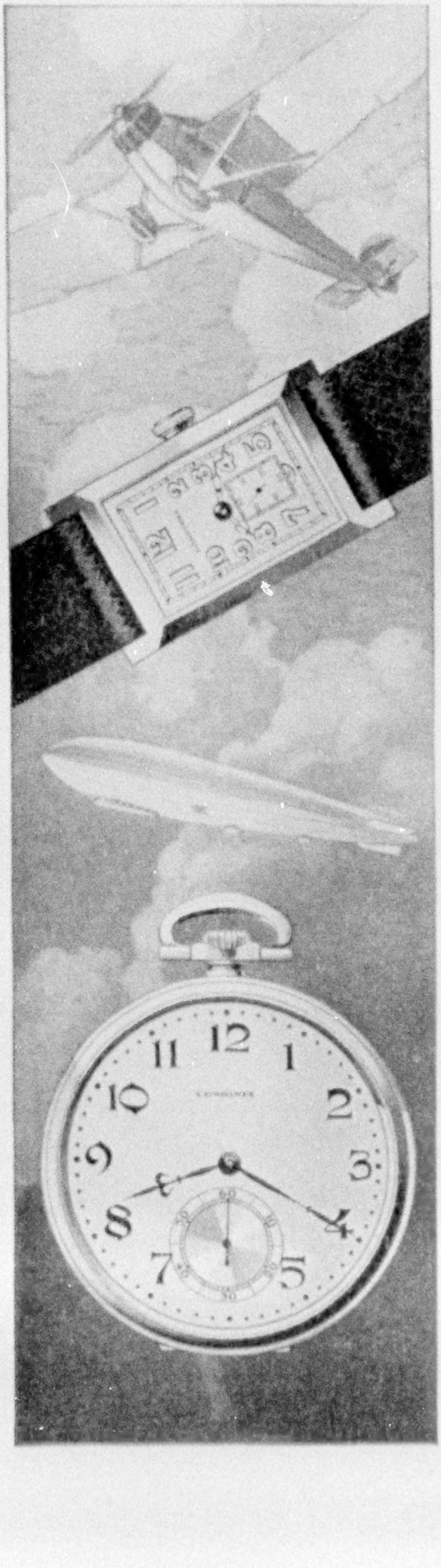

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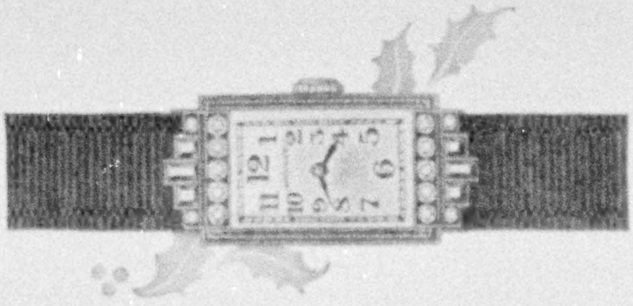
More than sixty years of continuous improvement have assured the Longines watch a world-wide reputation for accuracy.

Justifying the absolute reliance placed in their precision, Longines have been exclusive time equipment on nearly every long distance flight in the history of aviation, including this year's outstanding achievements of WILLIAMS and YANCEY, ASSOLANT, LEFEVRE and LOTTI and the GRAF ZEPPELIN.



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Longines in 1927 first broadcast the correct time over the radio. Now the "Longines Musical Note" is heard daily over one hundred stations from coast to coast.

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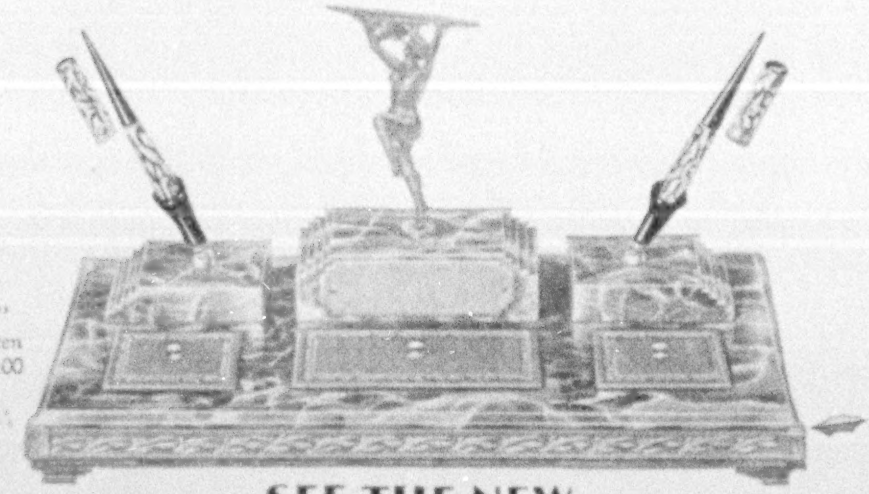
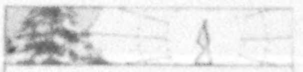


"Spirit of Aviation" base of green onyx, $250.00



Pocket Cap & Clip FREE with Every Desk Pen... Giving Two Pens in one Convertible Duofold is Parker's Greeting & Surprise this Christmas

SEE THE NEW

Streamline Shapes

for Christmas...in

Parker Duofold

Matched Pens and Pencils

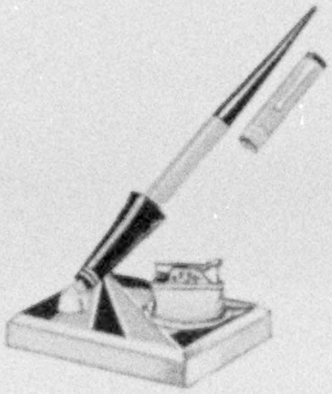
Obtainable only in Parker Pens and Pencils is this beautiful, symmetrical *Streamline* shape; also a Pocket Cap and Clip with *every* Desk Set Pen—was extra—now no charge. This combination makes 2 pens of one—for Pocket *and* for Desk Base. No other pen is convertible.

No other pens and pencils set so low or look so neat in the pocket as Parker's new *Streamline* Duofold with a clip that starts—not halfway down the cap—but at the *tip!*

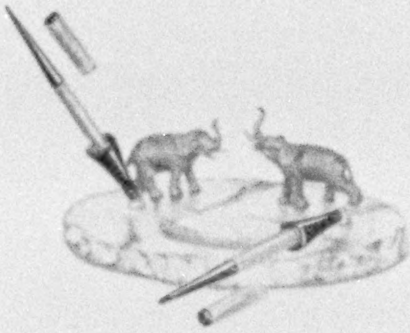
Pressureless Point, jewel-color Permanite Barrel [28% lighter than rubber, yet non-breakable], 24% greater ink capacity than average, size for size, and *guaranteed forever against all defects.

Good dealers everywhere are ready with Parker's new Streamline shapes for Christmas.

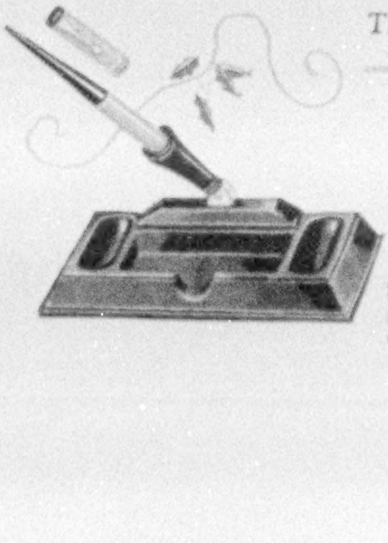
The Parker Pen Company, Janesville, Wisconsin



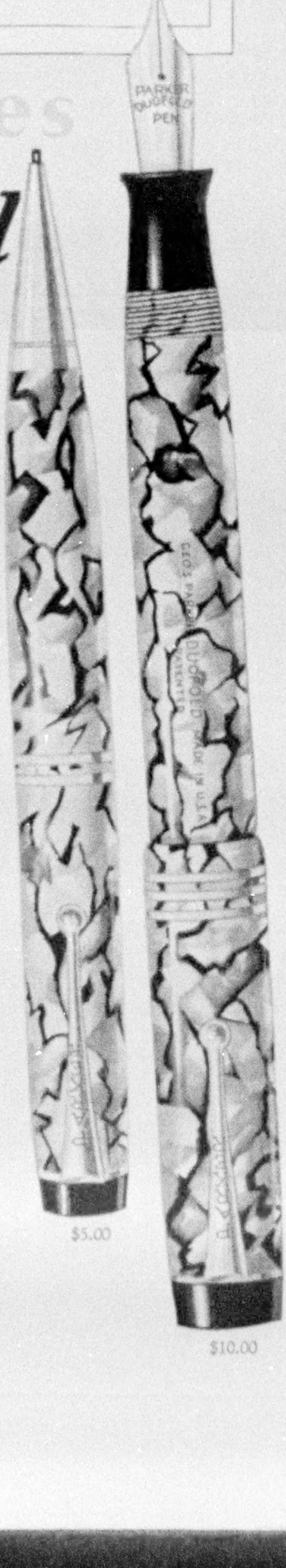
$18.00—Chromium Cigarette Lighter and Convertible Streamline Duofold Jr. Pen in base of Inlaid Enamel.



$57.50—Onyx Base, Bronze Finished Elephants, two Convertible Streamline Duofold Jr. Pens.



$10.00—Black Metal Base, places for scratch pad and clips. Convertible Streamline Duofold Jr. Pen.



PARKER DUOFOLD PEN
GEO. S. PARKER DUOFOLD PATENTED MADE IN U.S.A.

$5.00

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*To prove Parker Duofold is a pen of lifelong perfection, we offer to make good any defect, provided complete pen is sent by the owner direct to the factory with 10c for return postage and insurance.